

THE MARINE REVIEW

VOL. XXXIV. CLEVELAND, SEPTEMBER 20, 1906.

No. 12.

PORT OF ASHTABULA.

Wonderful transformations have been the order at Ashtabula for the past thirty-five years, but the greatest and most marvelous of all is the one

which is occurring now. From an ordinary lake port which has had a difficult time to maintain her supremacy, she is to take one long jump in the

next two years and become beyond question the greatest ore-receiving port on the great lakes and in the world. When the Lake Shore and

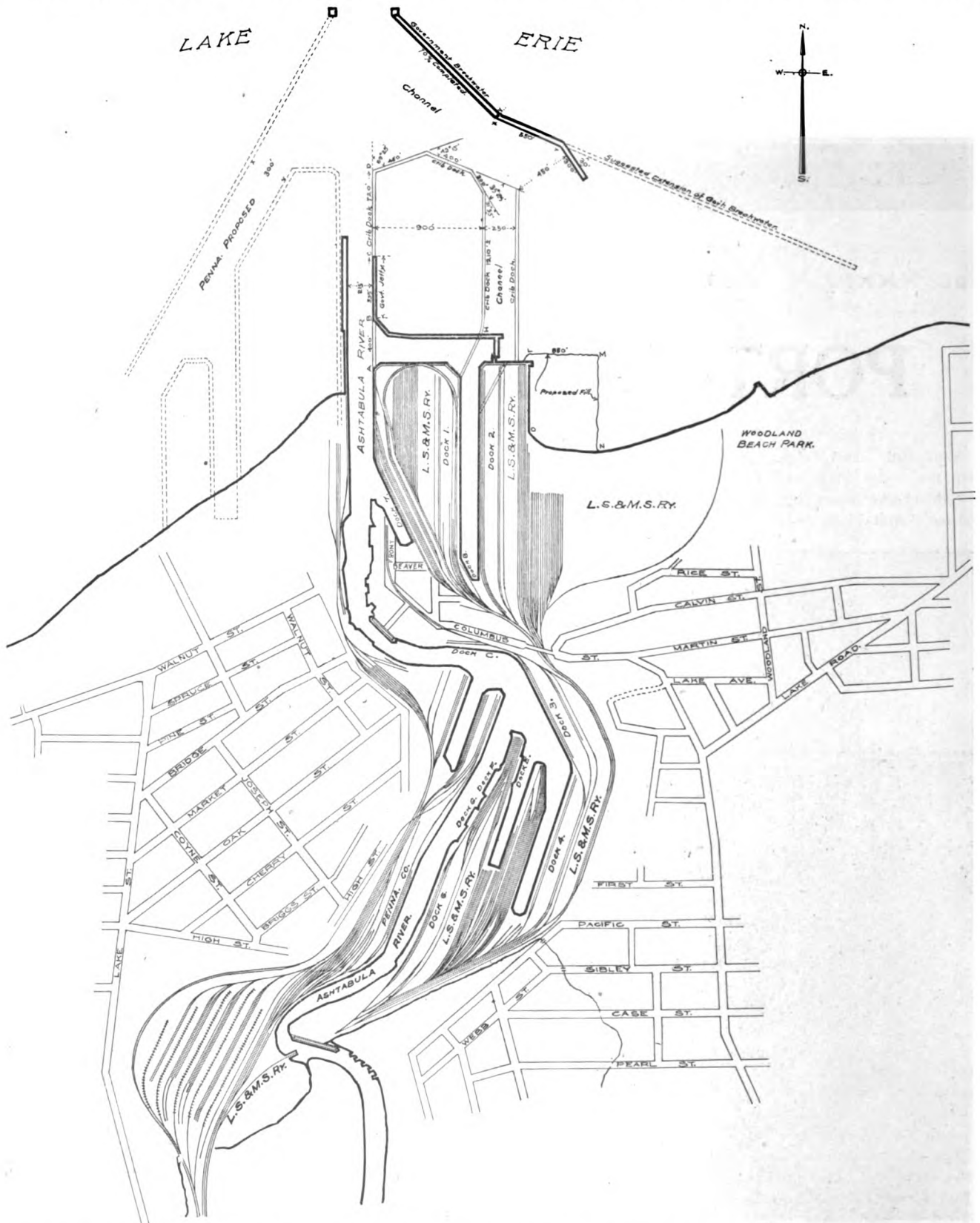


SHOWING THE WIDENING OF THE RIVER AND THE NEW CONCRETE PIER WITH THE OLD RANGE LIGHT OUT 60 FT. IN THE RIVER.

Pennsylvania systems' lake front improvements are completed, there will be no further question about her su-

the south shore of Lake Erie, but that was so many years ago there is no one alive now who remembers it.

through a channel dredged through the bar at the mouth of the river in 1802, and they let it go at that. They



MAP OF ASHTABULA HARBOR SHOWING GENERAL LOCATION OF LAKE SHORE RAIL WAY IMPROVEMENTS.

premacy. In fact, she will be in a class by herself.

The time was when Ashtabula was nothing more than an indentation on

The present inhabitants do not live in the past, anyway. They have a vague understanding of the first boat load of merchandise being hauled

now look for new and greater things.

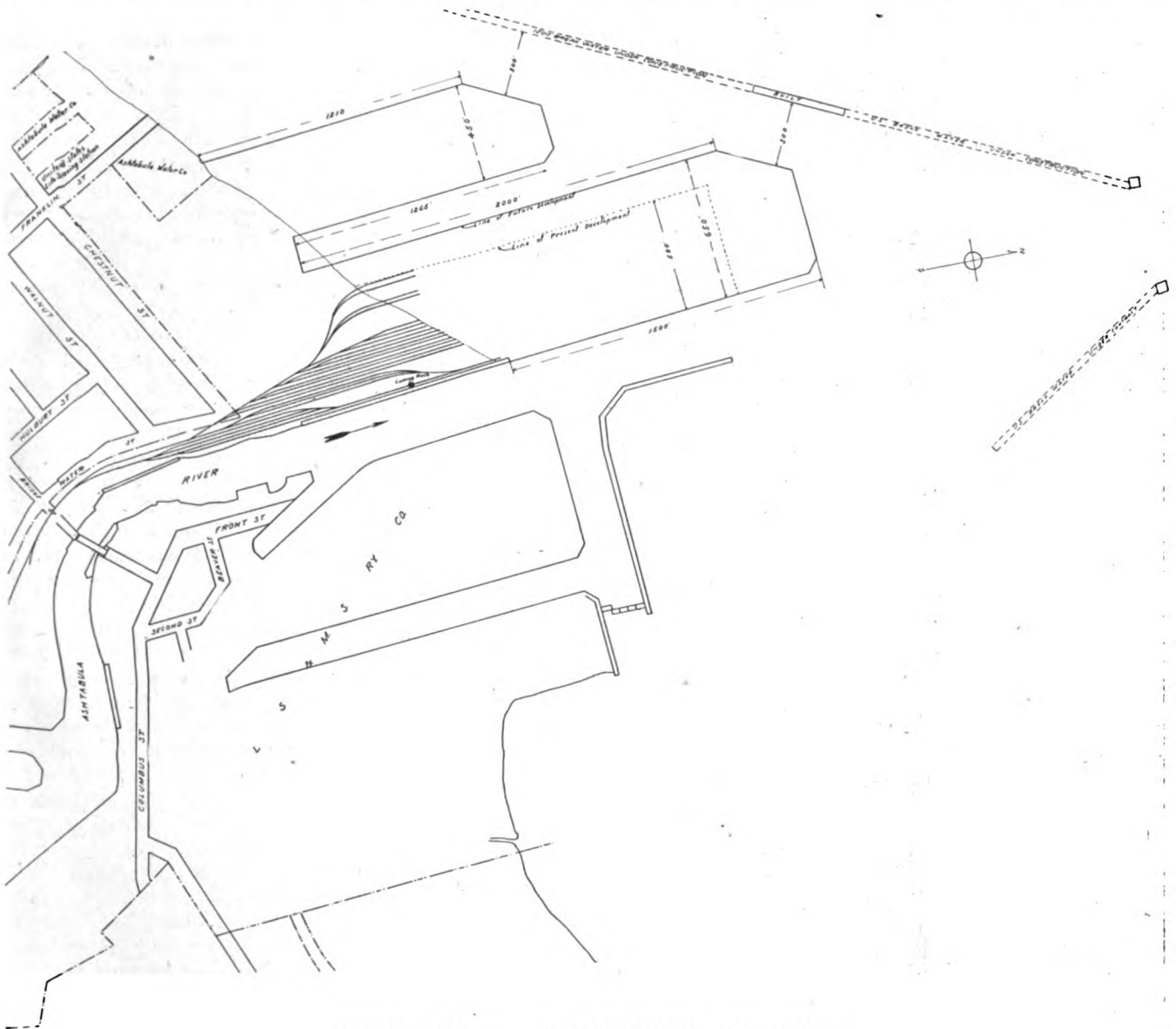
That every loyal Ashtabulaite has a right to do this is certain because the railroads which enter the port and

control its traffic have set aside millions for the improvement of their shipping facilities. They know that the whole lake freight movement is too great to be comprehended and they realize that the tremendous increase in lake tonnage means but one thing—a corresponding increase in dock space. For this reason, therefore, they will expend at least \$7,000,-

sible to rival the records made by the Hulett machines now in operation at Conneaut. Roughly speaking, the new area for storage and yards will run over eighty acres.

Doubling the capacity of a port like Ashtabula means a great deal when it is remembered that she received about 6,500,000 tons of ore over the old docks during 1905. The total lake

not be overlooked. The docks will be so arranged that the largest boats can go to the lake front, while the medium-sized and small freighters can trade above the bridge to the docks which have always given such good service heretofore. Such important items will result in taking tonnage from every other port on Lake Erie. With a short haul to the east, there is



GENERAL DIAGRAM OF PENNSYLVANIA IMPROVEMENTS.

000 in improvements. Both companies propose to keep abreast of the times and to ride on the crest of the country's prosperity.

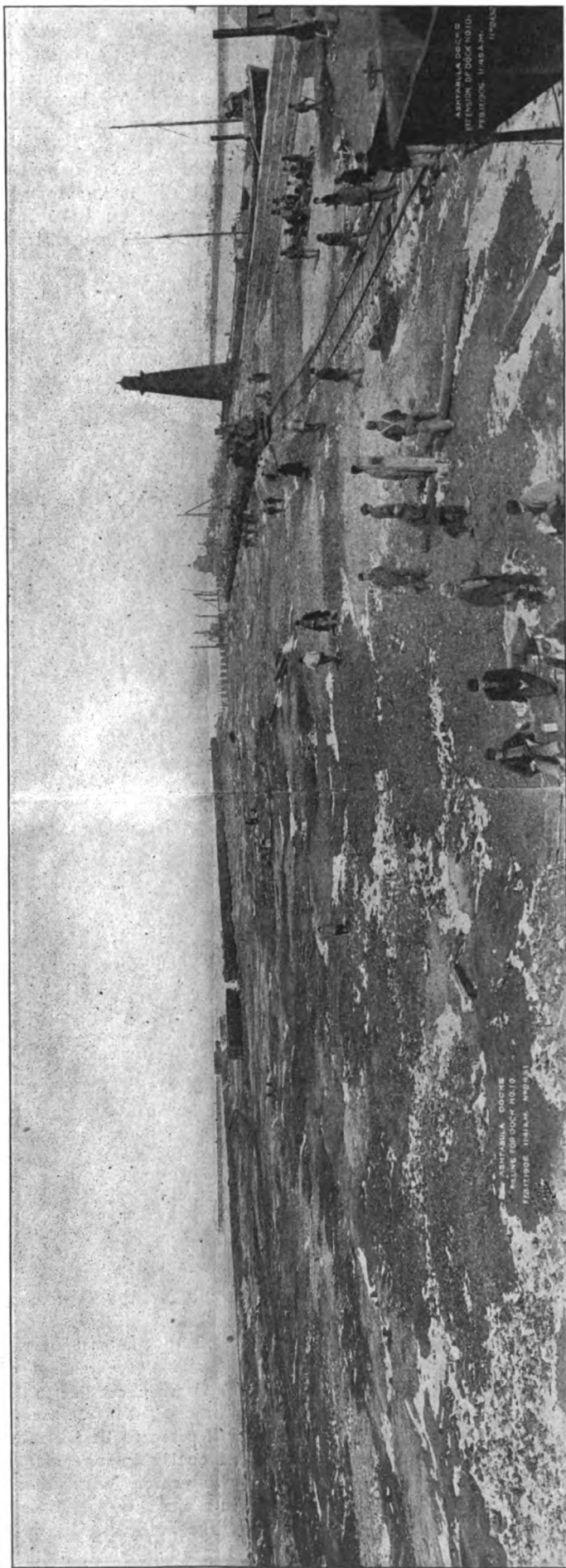
The plans outlined and already being carried out call for increased dock space which will easily double the capacity of Ashtabula's harbor. There will be miles of docks and the longest freighter now sailing the lakes will be able to come in and unload or load her cargo. No cargo will be too large for the new docks and the improved machinery will make it pos-

sible to rival the records made by the Hulett machines now in operation at Conneaut. Roughly speaking, the new area for storage and yards will run over eighty acres. Doubling the capacity of a port like Ashtabula means a great deal when it is remembered that she received about 6,500,000 tons of ore over the old docks during 1905. The total lake

movement will not run much over 40,000,000 tons in the next two years, so that Ashtabula will be in shape to handle nearly 15,000,000 tons of ore if the dispatch is good enough at both ends to allow for it. A little over 2,000,000 tons of coal were shipped in 1905, and the coal-loading facilities are extensive enough now to double this for bituminous coal, alone.

another argument for the supremacy of the port.

The short haul to the east over a low-grade road and the extension of the Lake Shore's Beach Creek line to the Clearfield anthracite district means that Buffalo will cease to be the most important hard coal shipping port on the lakes in two years. With Ashtabula already in a class by herself as a soft coal port, the anthracite business will make her doubly important. Boats which can be loaded with hard coal at Ashtabula will be sent there



FILLING IN FOR DOCK NO. 10 PENNSYLVANIA SIDE, ASHTABULA HARBOR, AS IT APPEARED ON FEB. 17, 1906.

in preference to Buffalo in nine cases out of ten.

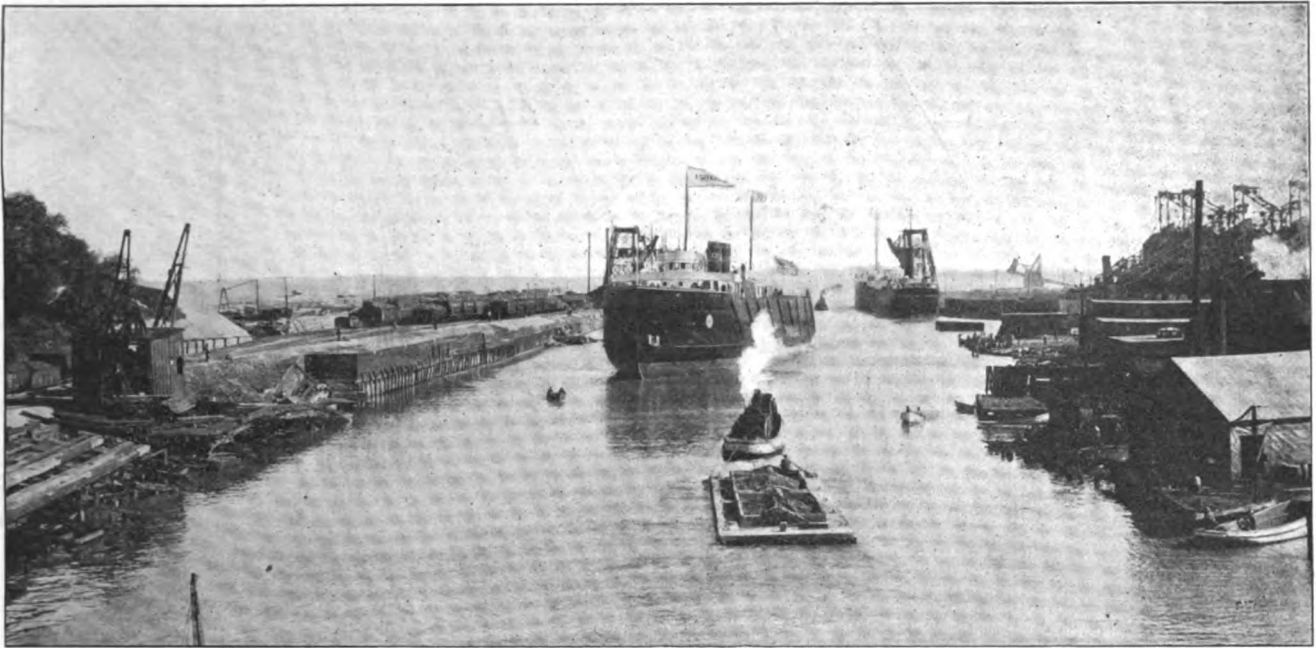
All the foregoing changes are to be accomplished facts and not idle dreams, because the plans are broad enough to admit of extraordinary enlargement by the time the present work is completed. The government breakwater will eventually extend from the outer entrance to the east and west shores, which means that additional docks can be constructed as the increase in business demands it. And in view of the fact that owners and shippers are hanging to the 10,000-ton freighters, it seems certain that another decade will see all the boats handled on the lake front.

The Lake Shore is now constructing under the immediate supervision of Mr. Edgar C. Bowen, assistant engineer, a 4,450-ft. stretch of dock and fill extending the present space on which the Pickands, Mather & Co. coal dump and Hoover & Mason clams and the Carnegie Steel Co.'s Browns and Hoover & Mason clams are located. The Pennsylvania, under the supervision of Mr. John P. Fitzgerald, engineer in charge, has already constructed a 1,125-ft. concrete pier, extending from the present M. A. Hanna coal dump along the main river, but the Pennsylvania is to have two 1,200-ft. and one 2,000-ft. docks in addition to this.

The work now being done by the Lake Shore was started June 1, 1906. The present east-and-west slip, used to get into the old Minnesota slip, will be abandoned and filled in when the outer lake area is filled. This will make a clear 900-ft. space between docks which will be 1,655 feet long at the furthest point. Boats will get into the Minnesota slip from the outer harbor then. In order to do this, thirty-seven 200-ft. cribs were used and 125,000 cu. yds. of sand and 250,000 cu. yds. of rock were excavated. To fill the enclosure made by the cribs will require 1,500,000 cu. yds.

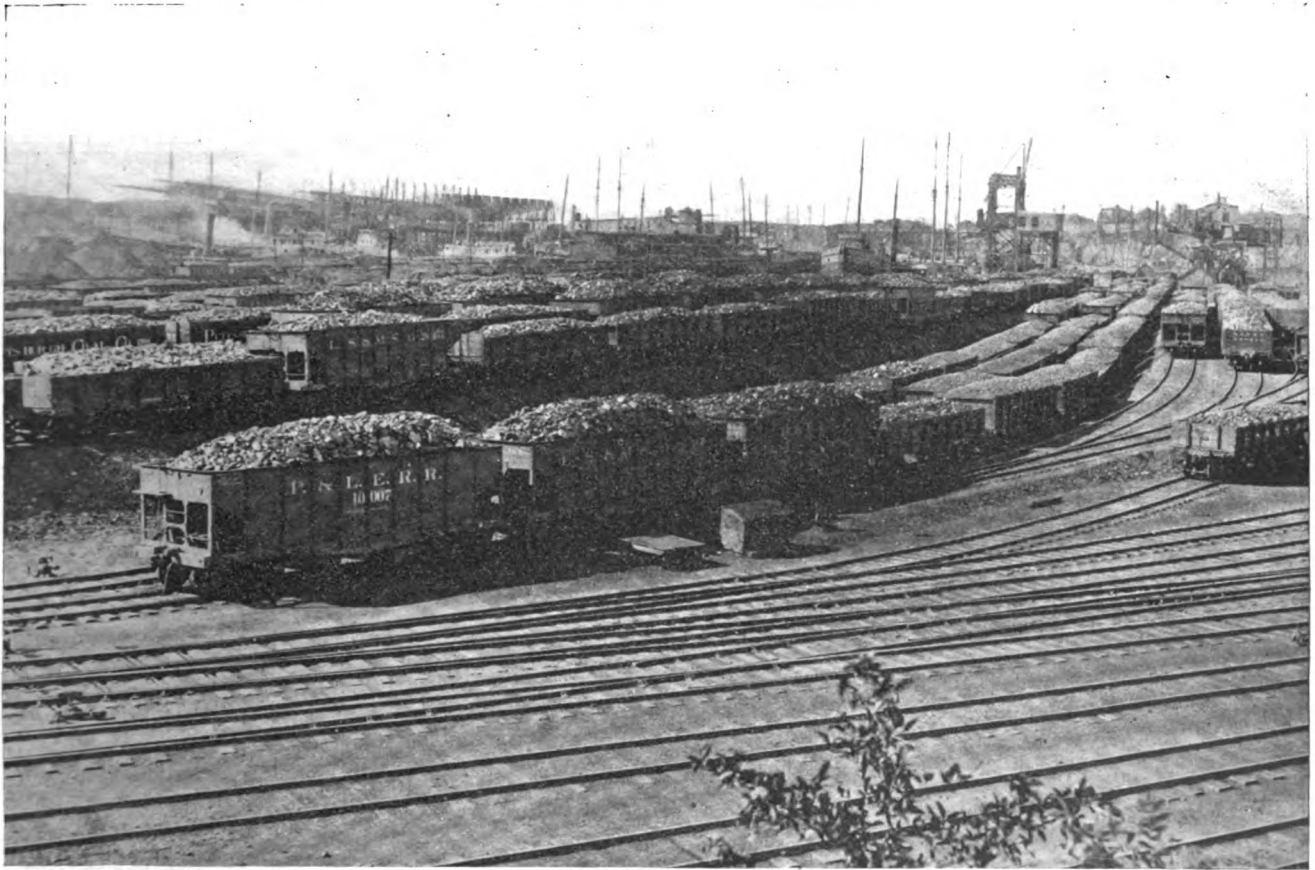
The Pennsylvania's work was started April 1, 1905. It was begun back of the shore line continuing the line of the M. A. Hanna coal dump dock. There are 1,120 ft. of concrete pier in the main channel and a fill 650 ft. wide has been made with stone jetty work on the west side of the fill 2,000 ft. long. In addition to this, there is a tremendous yard area on the shore which the railroad owns. The yards will probably extend up beyond the life-saving station, if the latter is removed to the main river, as seems likely.

Ashtabula's future as an ore, hard and soft coal port is unquestioned, but there is another trade which has not whatever other heavy commodities are sent across to the Dominion. She will carry 15,000 tons each trip and are well posted men in Ashtabula who confidently predict greater changes than have been enumerated in this



ENTRANCE TO ASHTABULA HARBOR IN 1906, SHOWING THE CARFERRY ASHTABULA IN THE FOREGROUND.

been mentioned. May 12, 1906, the new Pennsylvania & Ontario carferry she has recently been put on a three-trip-a-week schedule. The Ashtabula article. They assert that the port will become prominent as a grain-receiv-



LAKE SHORE YARDS ABOVE UNION SLIP SHOWING COAL AND ORE DOCKS AND BOATS IN HARBOR.

Ashtabula was put in operation between Ashtabula and Port Burwell to transport hard and soft coal and is an ice-crusher and will, therefore, run during the winter months. One thing leads to another. There ing outlet to the east on account of the shorter distance to New York and other eastern shipping points.

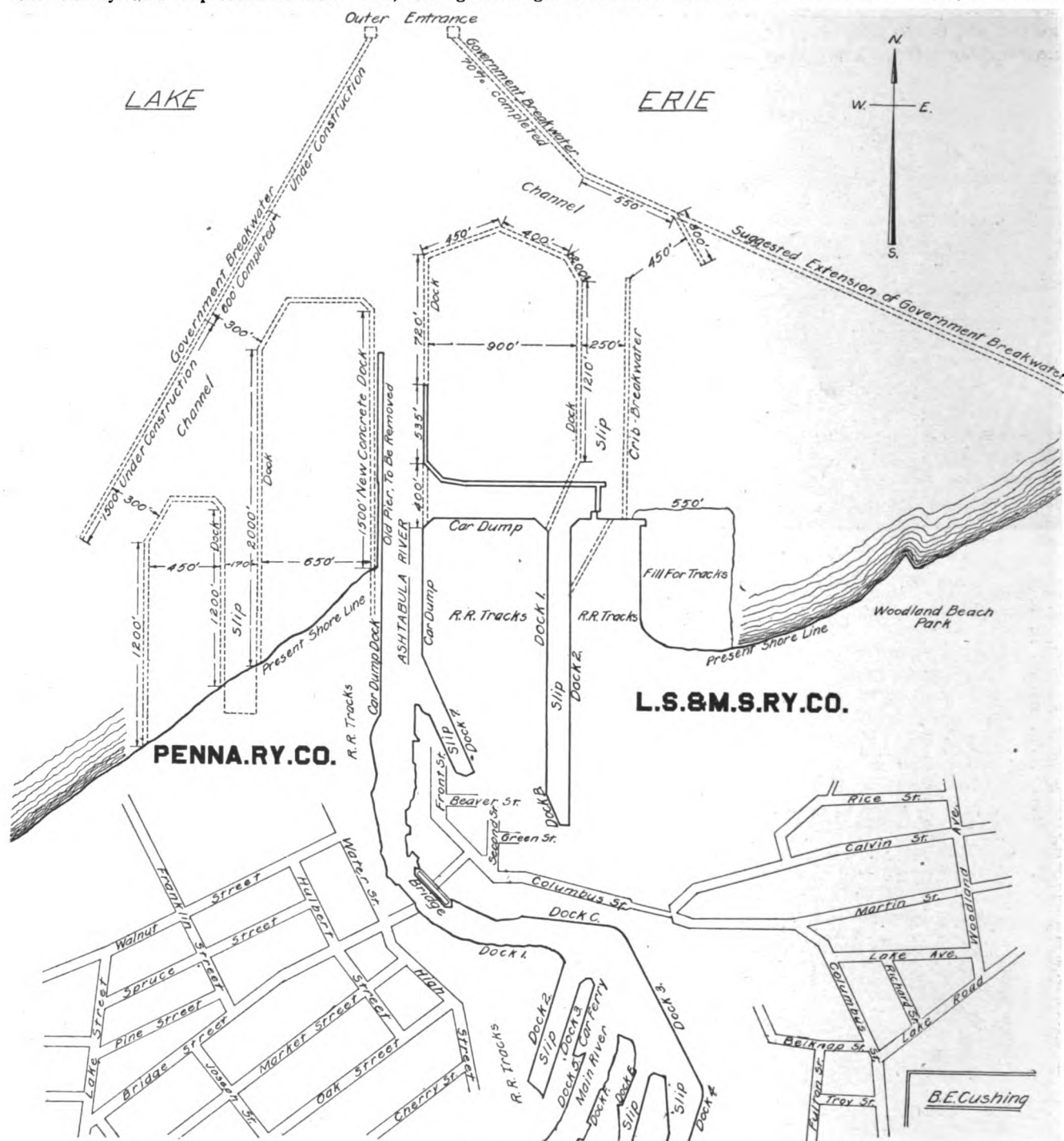
The Pittsburg & Lake Erie canal's northern terminal will be Ashtabula.

PENNSYLVANIA IMPROVEMENTS.

The Pennsylvania improvements now

ing machine almost due north toward the harbor entrance 1,100 feet, although the plans contemplate future extensions of 400 feet, making the length of the new dock

650 feet, so that when the undertaking is completed the receiving dock will be 1,500 feet long and 650 feet wide. The outer end of the dock will be 1,800 feet from



PLAN OF THE PENNSYLVANIA AND LAKE SHORE RAILROAD TERMINAL FACILITIES IMPROVEMENTS AT ASHTABULA HARBOR.

The heavy continuous lines on the above map show the present shore line dockage, piers and river bank; the dotted lines indicate the position of the proposed breakwater and dock frontage. It will be seen that an entire new lake front harbor is to be the outcome of the operations now in progress, the Lake Shore company doing the work on the east side of the river and the Pennsylvania doing it on the west side. The Lake Shore work embraces the completion of the portion of the east government breakwater already partially built and the construction of 850 ft. of additional breakwater. Cribbing will be built across the mouth of the present lake-front slip which is now entered from the west, and other cribbing will go in from the extreme outer end of the present east pier 720 ft. into the lake, thence east and back to the shore, enclosing a space of 900 ft. in width which will require 1,500,000 cubic yards of earth to fill, while 100,000 tons of stone will be needed for the cribbing. A crib-breakwater will be constructed on the east of the reclaimed section just described and will serve to protect a new slip, 250 feet wide, leading from the lake and giving a new entrance to the present lake front slip, the mouth of which is to be closed by cribbing. All channels and slips adjacent to the new work will be dredged to a depth of 21 feet and will necessitate in places a cut of ten feet into the solid rock.

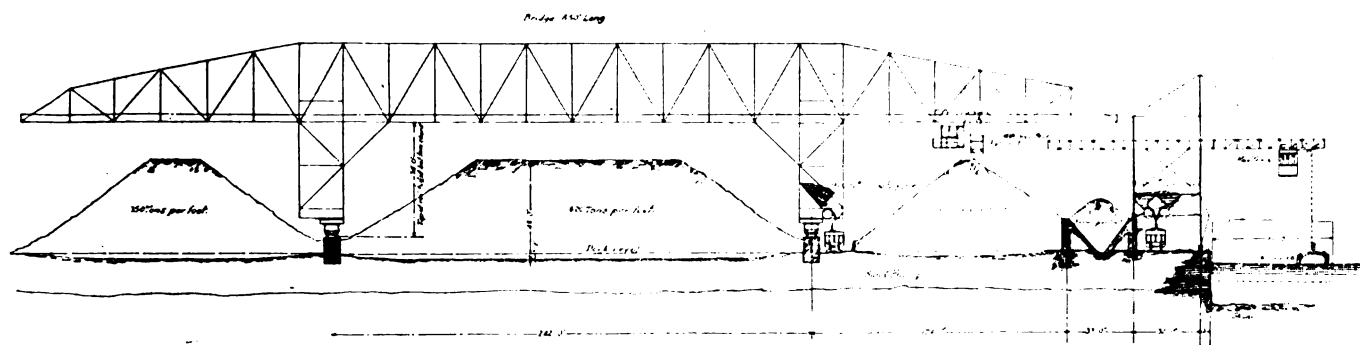
On the Pennsylvania side 3,300 ft. of breakwater is under construction and two huge sections of beach are being reclaimed, enclosing between them a new slip 470 ft. wide. The fill nearest the river is 1,500 ft. in length on the east side and 2,000 ft. on the west side. It has a width of 650 ft. The smaller fill to the west extends outward 1,200 ft. into the lake and is 450 ft. wide. Upon the completion of the Pennsylvania work and the construction of a new concrete dock 1,500 ft. in length on the west bank of the river, the present west pier will be removed, a change which will widen the river channel by 60 ft.

under way are on the west side of the river and will extend from a point 500 feet north of the old McMyler coal load-

1,500 feet. Present plans call for a width of the improvement of 520 feet and provision has been made to increase this to

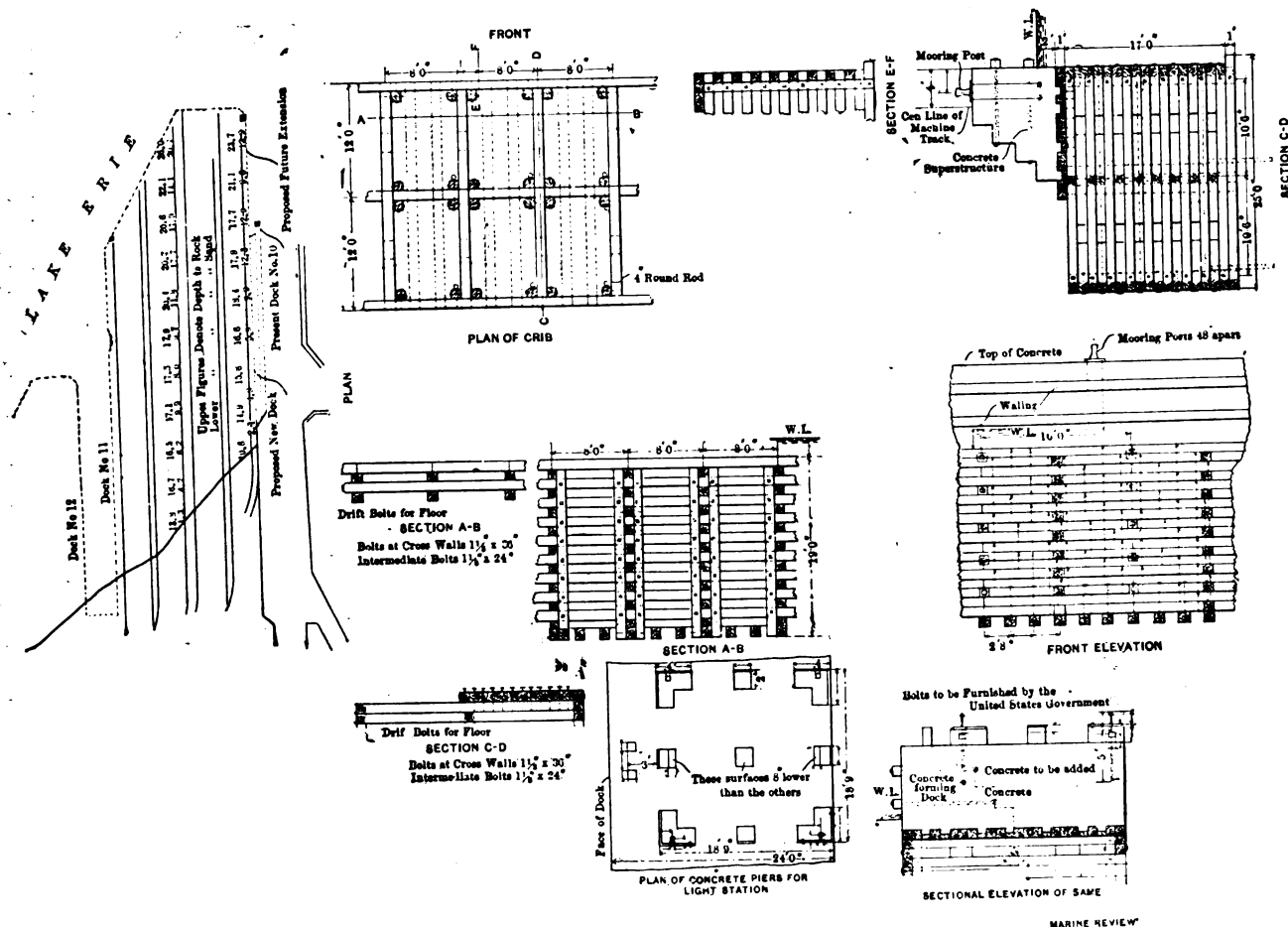
the breakwater entrance and the range light on the present west dock will be moved to the outer end of the new dock

so arranged that the operator can readily twist the grab crosswise of the hatch at right angles to the line of travel of the trolley. The motors will be of sufficient capacity to make round trips with maximum loads in 50 seconds from ore di-



DISTRIBUTING AND HANDLING BRIDGE, PENNSYLVANIA DOCK IN ASHTABULA HARBOR.

The runways of the unloaders will be of sufficient length to reach the outside of a vessel 65 feet wide and to discharge



DETAIL OF PENNSYLVANIA CO'S CRIB WORK.

into the concrete trough at the rear of the unloader, as shown in the accompanying sketch. Upon each unloader will be placed a scale hopper, resting upon scales of 180,000 pounds capacity. This scale hopper will have two discharge

rollers which will load cars upon one track beneath the hopper. An indicating dial will be provided which at all times indicates the amount of ore in the hopper, thus making it possible at all times to know to a nicety the exact amount dropped through the rollers into the car beneath. To load a car the rollers are actuated a sufficient length of time to discharge ore to the maximum capacity of the car, as indicated on the dial, at the same time enabling the cars to be loaded in train form without being disconnected. Mechanism for raising the boom and moving the machine along the dock will also be provided.

The bridge, as has already been mentioned, will be 550 feet long, and as shown in the accompanying sketch, will rest upon turntables, which permits either end to travel independently in order to better cover the storage piles. In the tower next to the dock will be placed a scale hopper, similar to those on the unloaders, and resting upon scales of 180,000 pounds capacity. The dial and method of operation will be the same as those on the unloaders. The grab on the ore bridge will be of the latest type, of 14 gross tons capacity, and the hoisting and traverse motors will be in the trolley and travel with the operator. Westinghouse air brakes will be used to control the traverse motion and air brakes and also air governors are provided to control the descent of the grab. Westinghouse friction draft gears are provided at the end of the bridge to prevent accident. The hoisting speed of the grab will be 140 feet per minute and the traversing speed of the trolley will be from 800 to 1,000 feet per minute. The bridge traverse speed will be about 60 feet per minute. The bridge will be electrically operated, 220 volts direct-current.

LAKE SHORE RAILWAY IMPROVEMENTS.

On the east side of the river the Lake Shore & Michigan Southern is rushing work on dock extensions which will greatly increase its facilities for handling both ore and coal. The improvements are on an elaborate scale, involving the expenditure of something like \$2,000,000, and, despite the energy with which the work is being pushed, will not be completed in their entirety before the close of 1908. Through the delay of governmental authorities in approving the plans as originally prepared, the Lake Shore lost considerable time in starting, though this handicap has already been largely overcome.

Briefly stated, the improvements consist of the extension of the present lake front dock about 1,600 feet further out into the lake, the new



Looking from right to left are the building, the harbor business district, P. Y. & A. slip, Pennsylvania & Ontario carferry slip. The old river bed is at left side with the Mahoning & Shenango dock on south and the Hanna portables on the opposite side.

ASHTABULA HARBOR IN 1906.

section according to plans having a uniform width of 900 feet. The west side of these docks will front on the Ashtabula river, and the east side upon a new slip to be about 250 feet wide. The river front will be equipped with coal handling machinery and will be given over exclusively to coal traffic. The river front as it now exists will be kept intact; as an extension

moved to give clear passage into the present slip reaching dock B. A large fill is to be made into the lake just east of dock 2 to provide room for a system of track loops, similar to that now in operation on the present docks where the gravity system is extensively employed for the handling of cars.

A crib breakwater is to be con-

constructed by the Edward Gillen Dock, Dredge & Construction Co. The dredging work, involving the removal of some 200,000 cubic yards of sand and rock, is in the hands of the Standard Contracting Co., Cleveland. The crib dock work, including the building of about 4,500 lineal feet of ordinary crib construction, is being done by the railroad company's



VIEW OF MINNESOTA SLIP AND LOWER LAKE SHORE YARDS FROM COLUMBUS STREET BRIDGE.

the canal between the end of the present docks and the government jetty will be built in, a distance of about 400 feet, the jetty wall will be made use of as a part of the new river frontage and a new section 720 feet in length will be added at the end. Additional room in the river is provided for in the plans of the Pennsylvania company, which is to remove the old government pier and set its new dock front back from 50 to 60 feet.

The ore handling plants of the Lake Shore will be on the east side of its docks, fronting on the newly constructed slip. A roomy channel will be provided along this side, a considerable section of the government jetty will be torn away at the lower end of the channel, and an out-jutting corner of dock 2 will be re-

constructed along the east side of the new slip. The entire improvement will be under the protection of a government breakwater almost 2,000 feet in length on the Lake Shore side. A section slightly more than half this length, adjacent to the mouth of the harbor, is being built by the government. Work on it was 70 per cent completed in May, but since that date it has been tied up in the courts most of the time by troubles of the contractor and little progress has been made. An elbow section 850 feet in length is being constructed by the railroad as an extension to the southeast end of the government project. Work on this has been rushed and it is now practically up with that on the government section, begun months earlier.

The breakwater extension is being

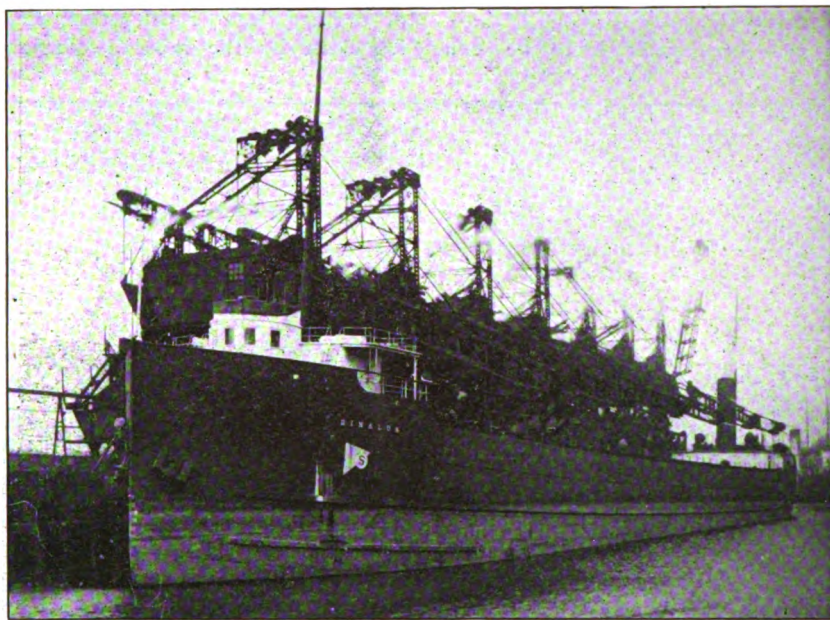
forces. About 1,000,000 cubic yards of filling will be required.

The cribs enclosing the dock structure will be completed by the close of this year, the long crib dock on the east side of the new channel will be built in 1907 and it is expected that the entire work will be finished by the end of 1908. The Lake Shore docks will then extend about 3,000 feet out into the lake beyond the original shore line. The additional facilities provided will at least double their present capacity. They will avoid the necessity of working freighters up through the winding channel of the river and particularly around the sharp bend which now prevents the entrance of the largest craft. The special type of ore and coal handling machinery to be installed has not as yet been determined.

CRIB WORK.

Expense has been no object to either company in the crib work and concrete pier construction on the lake front. In fact, the Pennsylvania's concrete pier in the main river has been built to last for ages. The

pier is two 12 x 12 white oak wale strakes running its entire length. These are made fast to the side of the pier by one and one-eighth inch rods which extend to the other side through inch and half gas pipe. This makes it possible to renew them



UNION DOCK, STEAMER SINALOA UNLOADING.

Lake Shore engineer figures his docks will last for fifteen years, after which time new conditions may arise to make changes necessary.

The concrete pier rests on solid shale rock, to which it is anchored by seven-foot car axles. The rock was excavated to give a uniform depth of 21 feet below the mean lake level. Two feet below the water is the deck of the cribs from which the concrete is laid. The cribs are 19 ft. high and the concrete extends up 9 ft. The bottom of the crib is 25 ft. across and the decks are 12 ft. across. The top of the pier is 8 ft. wide.

Each crib on the Pennsylvania contains 250,000 feet of timber, 40 tons of iron and they are all filled with shale rock. The car axles are set 4 feet in the rock and three in the crib. There are two set every 8 ft. like this. The timber used was all 12 x 12 hemlock and it is bolted in every conceivable manner to add strength to the structure.

Seventy-five yards of concrete are set in every 25 ft. of pier. Expansion joints made in a V shape with five layers of three-ply paper are found every 25 ft. Iron mooring posts are set in the concrete every 50 ft., each one weighing 1,300 lbs. They are anchored with heavy rods sunk in the concrete.

The novel feature of the concrete

when necessary without having to cut away the concrete to do it.

The Lake Shore crib work is similar to the Pennsylvania's, except that

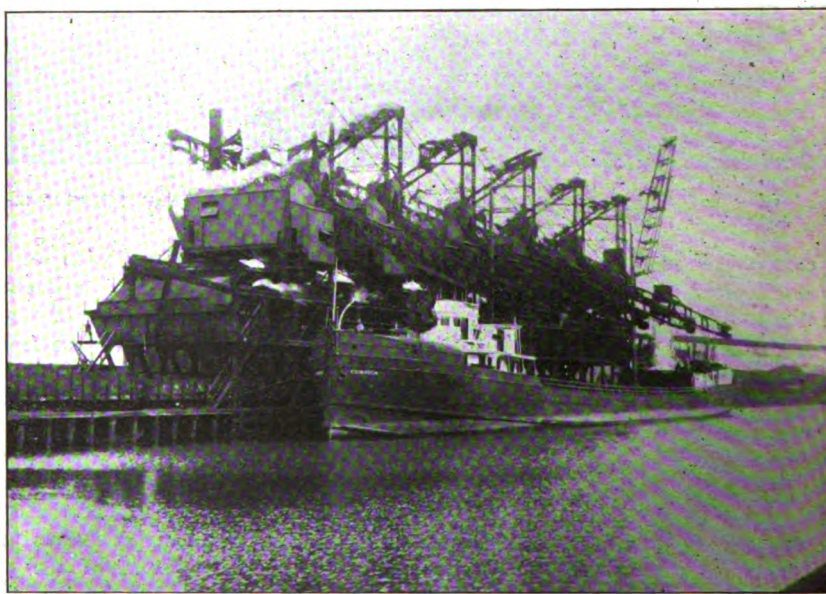
The Pennsylvania conveyors will store ore in a 4-ft. concrete depression, which gives increased storage capacity.

ASHTABULA'S HISTORY IN PICTURES.

Ashtabula's history is told better by the pictures which have been taken from time to time. The accompanying views show the entrance to the harbor in 1873 and the interior up beyond the old pontoon bridge as it was in 1874, looking north and south. The harbor entrance picture has been used through the courtesy of Capt. James W. Calloway and the others through John Thayer's kindness. So far as is known, they are the only original pictures in existence.

The harbor entrance is as primitive as it could be with the old lighthouse at the end of the east pier in a spot which would correspond with the Pickands, Mather & Co. coal dump now. The schooners lying at the pier are supposed to be the Thos. W. Ferry and the Kate Gillett. The two-masted schooner lying on the west bank at the right-hand side of the picture is the Vampire, built at Ashtabula in the old days. The identity of the other schooner at the west side of the harbor entrance has not been learned.

In the days when the picture was taken, the railroads had not yet cut



SUPERIOR NO. 1, MINNESOTA SLIP.

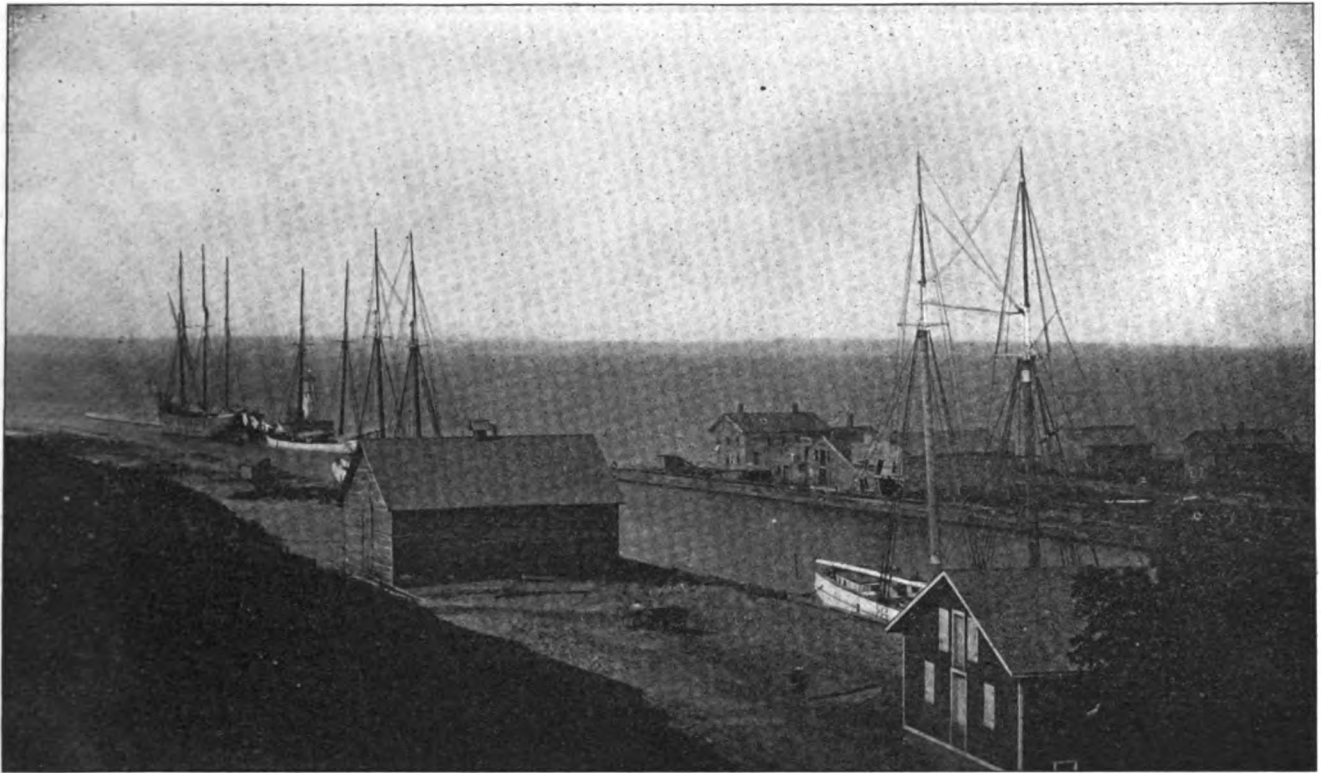
2 ft. below the water line a superstructure of white oak will extend up 6 ft. above the surface of the water, making the dock. The cribs are also filled with Kelly Island limestone instead of shale rock hauled by boat and by rail.

in on the lake trade. As can be seen from the picture, the warehouses of the different merchants were still standing, and they are mute testimony of former busy times. Hubbard & Co.'s old yellow warehouse is located under the tree at the right and on the

east pier is Morey's hotel, Humphrey's grocery and warehouse and Seymour's warehouse and the Willard Wells &

warehouses bring back memories of Ashtabula's steamboat days, when all the boats trading up or down would

goes shipped out, oftentimes as far west as Chicago, consisted of grain and baled hay, dressed beef, cider and



VIEW OF ASHTABULA HARBOR IN 1873.



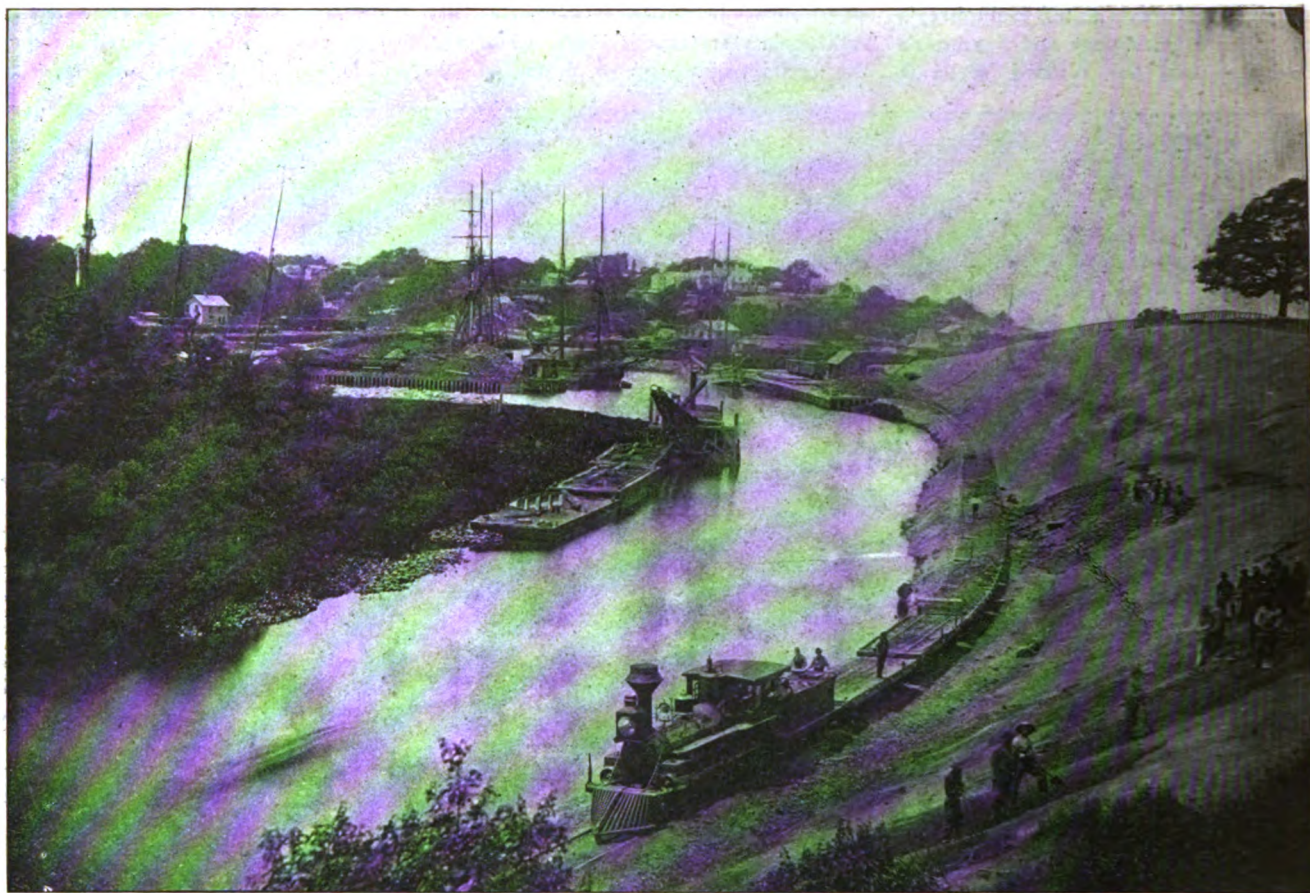
ASHTABULA HARBOR AS IT APPEARED IN 1874.

Co. warehouse. The buildings back of the pier are the hotel barn and a private dwelling house.

The Morey hotel and the different

make regular stops to pick up or put off freight or passengers. They would stop at the piers where the water was deep enough for them. The car-

apples. The cargoes received were general merchandise mostly, but barrel staves and lumber were also big items.



VIEW OF ASHTABULA HARBOR TAKEN IN 1874.

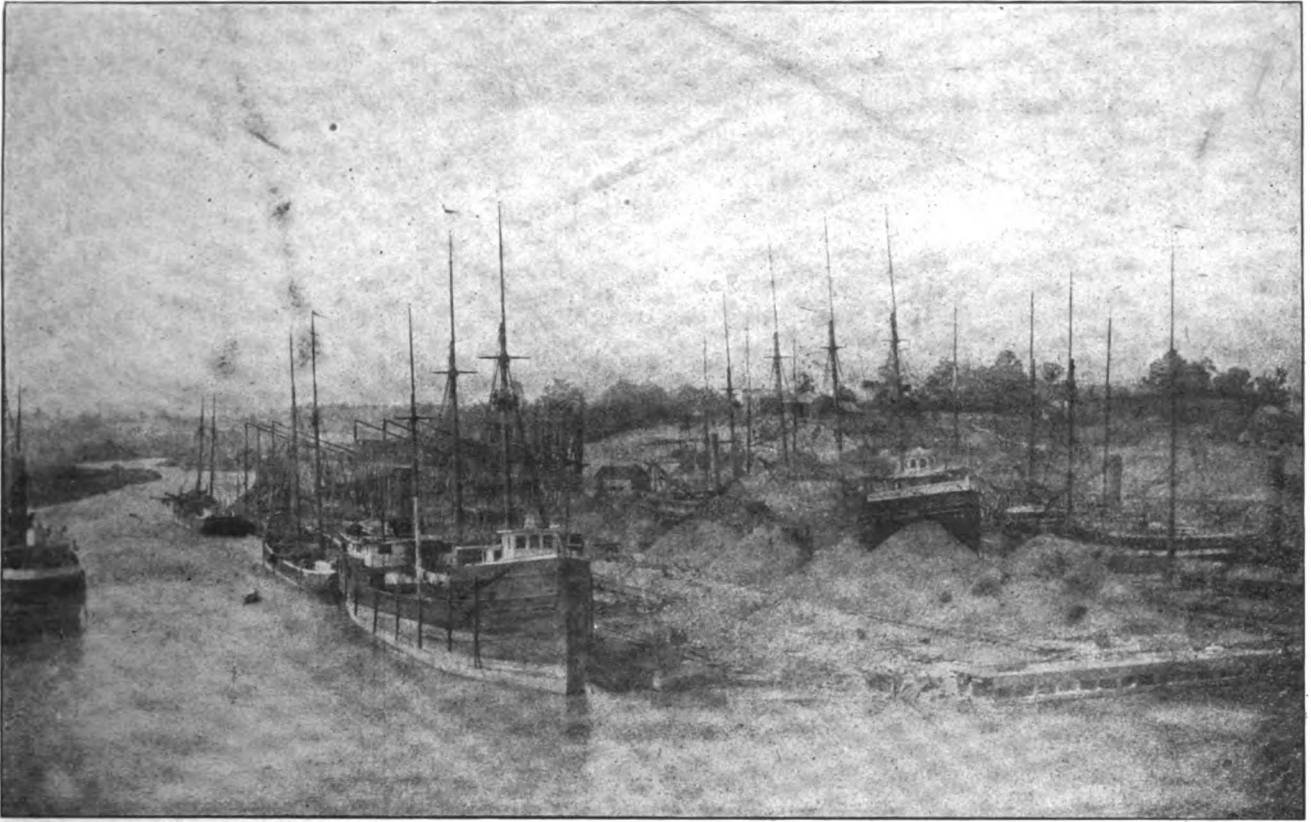


ASHTABULA HARBOR IN 1875.

Capt. Albert Field, the 80-year old proprietor of the Fisk house, has vivid memories of the days when he

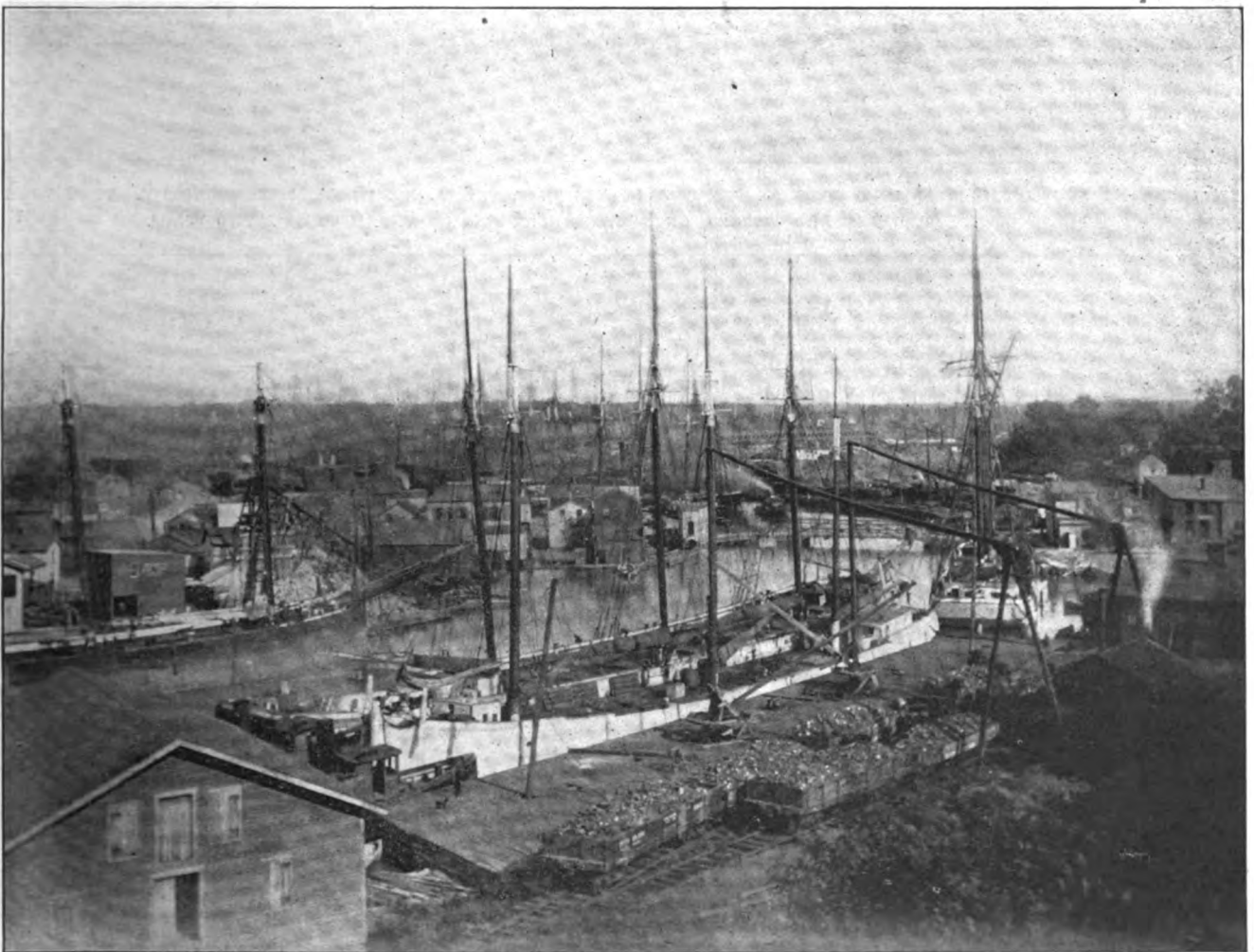
wheeled on the old side-wheel steamer Ben Franklin. She ran between Buffalo and Toledo, but stopped at every

intervening port on the south shore, as well as Monroe. He says that passengers and package freight made up



P. Y. & A. SLIP AND OLD HANNA COAL DOCK.

From an old photograph.



VIEW OF ASHTABULA HARBOR IN 1884.



THIS PICTURE SHOWS THE TWO LONG TRESTLES FORMERLY IN USE ON P. Y. & A. NO. 1 DOCK AFTER LOCKPORTS. THEY WERE WOODEN STRUCTURES AND WORKED ON SAME PRINCIPLE AS BROWNS. USED ONLY TWO YEARS.



UNION SLIP AS IT LOOKED IN 1885 WITH LOCKPORTS AND NOBLE & HALL MACHINES ON NO. 4 AND BROWNS AND LOCKPORTS ON NO. 5 OR THE UNION DOCK.

their business, but lumber and grain was also carried. In those days, he says, the east pier would have to be built out at regular intervals on account of the beach making too fast.

Capt. Field was on the Western Metropolis when she used to make the

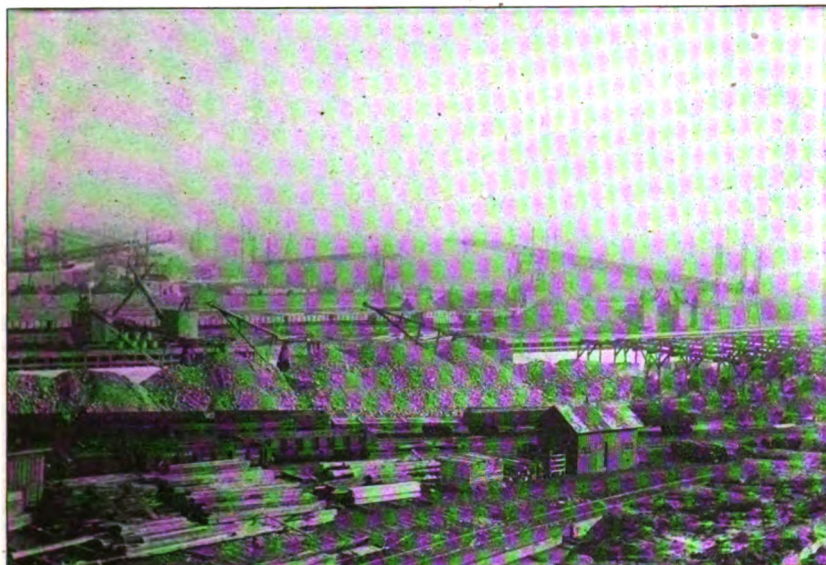
gine Lion with a train of flat cars and a gang of men loading some of the clay bank. This bank began to fall away in '74 and it was necessary to resort to this method to keep the river clear. The first dock on the east side of the river is the Lake

Bell. On the ore dock are the old Lockport machines used to unload the ore. At the corner of the dock the schooner Timothy Baker is seen, while behind her is the bark Peshigo. The old Ohio Exchange hotel is visible on the top of the hill just over O'Neil's store.

The crab apple tree seen at the right of the picture on the hill, is one which stood just about where the Lake Shore's water tower does now and a little north of the cut over which the Columbus street bridge runs. John Thayer lived just south of this tree on what is now called Thayer's hill, and he was in the habit in his younger days of picking the apples on this tree.

According to the picture, Bridge street, the busiest street in the Harbor, was nothing more than a clearing in the woods. It came along then just below the P. Y. & A.'s depot, which is shown at the left with a passenger train and freight cars lying on the tracks. Daily passenger trains ran to the Harbor in the old days.

The picture taken in 1884 shows the "old yellow warehouse;" the Haskell dock with the "grasshopper" rigs for loading coal; Humphrey's lime kiln, behind which the McKinnon Iron Works is now located; the old pontoon bridge, widened considerably at that time; Devney's ship yard,



UNION SLIP AS IT LOOKED IN THE LATE 80's.

run from Buffalo to Cleveland in eight hours and a quarter, he says. The people would come by rail as far as Buffalo and then by boat to Cleveland, where they would again take the cars for the south. There was only a nine-hour interval to catch the trains, so it needed speedy boats.

Ashtabula was primitive in many ways in 1873 and 1874. As will be seen in the picture looking up the river from Humphrey's lime kiln, there are only three buildings of any consequence in sight. The tug Dexter lies by the bridge and O'Neil's ship chandlery store. The Canadian schooner Pictou, laden with Coburg ore; the Starling, just unloaded; the Jane Bell and the steamer Wm. H. Barnum, in the P. Y. & A. slip are the only boats in port.

In 1874 the river bed made a long circuit to get up to the end of the valley. It can be seen winding its way down to the lake but the peculiar shaped peninsula known as Plum Point does not show. In the picture which looks up the river Plum Point comes in just beyond the wooded area beside which is a dredge. This was dredged away in later years to give the Lake Shore quicker access to the main river. This made a winding basin and allowed for two slips now in active use.

The picture taken looking down the river shows the old Lake Shore en-

Shore's No. 1 and the building standing on it is the first Lake Shore depot. This depot was erected in about forty-eight hours to hold the harbor rights obtained by the railroad. The



OLD-TIME TRESTLE WORK ON P. Y. & A. SLIP DOCKS WITH LOCKPORT MACHINES. NOBLE & HALL MACHINES ON LAKE SHORE'S OLD FOUR. NO. 1 DOCK CAN BE SEEN ON EAST SIDE RIVER.

schooner Starling is lying at the dock waiting to be unloaded.

On the west side of the river, are dump scows and the Lake Shore's dredge Hercules. Further on in the P. Y. & A. slip is the schooner Jane

across from the Haskell dock; what is now Cheney's store, and a great collection of schooners. Over the top of the buildings on the east side of the river can be seen the two white stacks of the old steamer Progress,

which foundered last year on Lake Michigan. The harbor as it looks in 1906 is not the same place as it was then.

HOW IS THIS M. A. HANNA & CO.?

As can be seen from the accompanying picture, the old Lockport ore-unloading machines were extremely primitive compared to the modern clam shells and grab buckets. When they were used, the rule was to put only two on a boat. This was customary because they required a forty-foot space to work in. An incident which came up in 1879 shows how strongly the rule of two machines was adhered to.

It is authentically related that M. A. Hanna & Co., at Cleveland, wrote to Scott & Co., at Erie, protesting against using more than two machines on a boat, saying J. P. Manning, Lake Shore agent at Ashtabula, was using more than two. Scott & Co. referred the letter to Mr. Manning with the inquiry endorsed on the letter: "How is this J. P.?" The reply from Manning was characteristic.

"The Lake Shore railway," he responded, "put me here to work for its interests and as long as I am here I will do it."

There was cause for complaint be-

day, if freighters could be unloaded on both sides shippers and owners would be highly pleased.

The Lockports and what were known as the Noble & Hall machines

wheel was used to carry the horizontal engines over the center.

As may be seen on the modern steam shovel, the Lockports and Noble & Halls had jack screws at each



NO. 2 DOCK, LAKE FRONT, WITH TEN BROWNS, AS IT LOOKED IN THE EARLY 90'S.

THIS DOCK WAS CONSTRUCTED AND PUT IN OPERATION IN '91. SUPERIOR NO. 1 HAD NOT YET BEEN CONSTRUCTED.

were both alike except that the former had a friction and the latter a clutch gear for hoisting and lowering. The cranes swung in a half circle by

corner in front to hold them down and keep them from tipping over. Tubs and one-ton buckets were used on the machines.

The M. A. Hanna Co. is still using seven Lockports in the "Lane," where P. Y. & A. dock ore is still stored. This is up beyond the Lake Shore draw bridge.

TOPKY BROS.

Topky Brothers, whose ship chandlery establishment can be seen in the advertising columns of the MARINE REVIEW, started in business in 1886, and located in their present store in 1890. As time went on, they were prompted to add several buildings on account of the increasing demands of captains and engineers on the modern freighters. They have endeavored to keep abreast of the times by keeping their stock in shape to meet any demand from either the forward or after end of the boats.

The new carferry steamer Ashtabula, operating between Ashtabula and Port Burwell, was tested last week and fulfilled every requirement. With a full load of thirty cars of coal, the ferry made better than fifteen miles an hour. The actual running time of the round trip between Ashtabula and Port Burwell was nine hours and 25 minutes.



OLD LOCKPORT MACHINE FORMERLY USED ON P. Y. & A. DOCK, NOW USED IN PENNSYLVANIA STORAGE YARDS, KNOWN AS THE "LANE."

cause Mr. Manning had some time before instructed his foreman to put on three machines. His action must have been the starting point for the desire to get boats out quickly. To-

means of a swinging gear. The friction wheel was attached to an intermediate shaft which was connected to a spur gear and this was attached to the hoisting drum. An immense fly

DOCKS AT ASHTABULA.

Ashtabula harbor has ten ore docks, of which five can be called modern. In addition to these, there are three coal dumps. The new improvements

given up when Plum Point was dredged out.

No. 4 dock, which is located at what is now called the Union Slip, was constructed in '79, being then

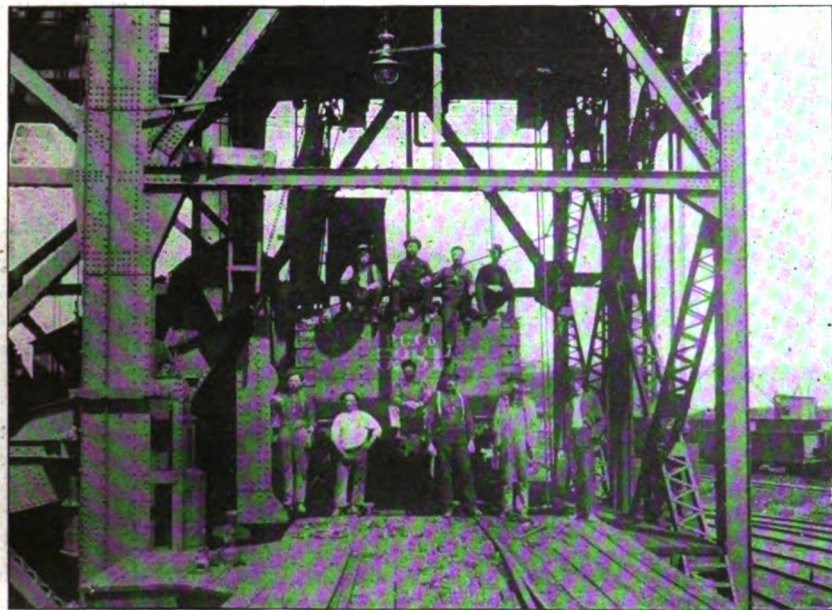
the slip in 1879 and 425 feet were added in 1882, making a 1,325 foot frontage. Three Brown hoists were erected on it in 1885 for coal and ore. Three more Browns were put on the same year. These were superseded by the Brown hydraulic coal machine in 1896, and the latter was succeeded by the seven Hoover & Mason 5-ton clams now in use. This dock is now known as the Union dock, working day and night.

No. 6 dock, up the old river bed, known as the Mahoning & Shenango or M. & S. dock, was operated with eight Browns and three McMyler whirlies in 1890. They are still in use, though the operating company is waiting on the Lake Shore to install new and modern machinery. This dock only works days.

No. 3 dock, the Angeline, almost abreast the P. Y. & A. slip, was operated in 1889 with six Browns and two McMyler whirlies in 1889. Three more McMyler whirlies were added in 1890. They are still in use, but like the M. & S., new machinery will soon be erected. The Angeline does not work nights.

No. 2 dock, lake front, operated by Pickands, Mather & Co., was operated with twelve Browns in 1891, and these are still used on this dock. Only day work is done at this dock.

No. 1 dock, lake front, known as



MCMYLER COAL DUMP AT 5½ DOCK (PITTSBURG COAL CO.) JUST BEFORE THE CAR IS DUMPED INTO PAN AND PAN RAISED TO SHOOT COAL INTO BOAT.

will result in adding more modern docks, and it is rumored that some of the docks now in use will be dismantled when the new docks are put in operation.

Although the P. Y. & A. docks were doing business three years before those of the Lake Shore, it is a fact that the Lake Shore now has more than the P. Y. & A. The reason the Lake Shore got started so late was that the officials overlooked the harbor and finally got in at the eleventh hour and began operations in '76.

No. 1 Lake Shore dock was constructed in '73. It was located at the first bend in the river above the bridge and was 300 feet long. Two Noble & Hall machines were put on it in 1879.

No. 2 dock, now obliterated, was located above what was known as Plum Point. It was 312 feet long and was constructed in 1873 and 1874. Hurt automatic unloaders were installed on it. These consisted of a tower, boom and track. The ore would shoot up the boom, in one-ton buckets and trip with whiffle tree and angle iron and then shoot back.

No. 3 dock, 300 feet long, was built in '73 and '74 above Plum Point. It has also been obliterated, but while it was in use, the old style trestle coal chutes were in operation on it. Both No. 2 and No. 3 docks were

1,000 feet long. In 1882, 450 feet were added. It is now called Superior No. 4 and is leased by the Carnegie Steel Co. Six Noble & Hall ma-



GROUP OF HOISTERS TAKEN AT MAHONING & SHENANGO DOCK WHILE WORKING A BOAT OUT.

chines were installed on it in 1882 and Superior No. 1, and operated by the two Lockports. Four Brown hoists were put on it in 1887, two more in 1888, Browns in 1894, and three Hoover & Mason 5-ton clams were put up in 1888.

No. 5 dock extended 900 feet along 1902, three more being added in 1905.

This dock works day and night.

The P. Y. & A. No. 1 dock was operated in 1873 and was constructed before any other ore or coal dock in the harbor. Coal was shipped from it, June 25, 1873, and ore was received over it, July 11 and 12, 1873. Lock-

ets opening at the bottom, and whirlies for hoisting was the last in use there. It was erected about 1888.

In 1884, ring-arounds or grasshoppers were in use on No. 1 and the old Haskell dock below the bridge on the west side. These were derricks with

scrapers. The Fast Hoists and the scrapers are operated by electricity.

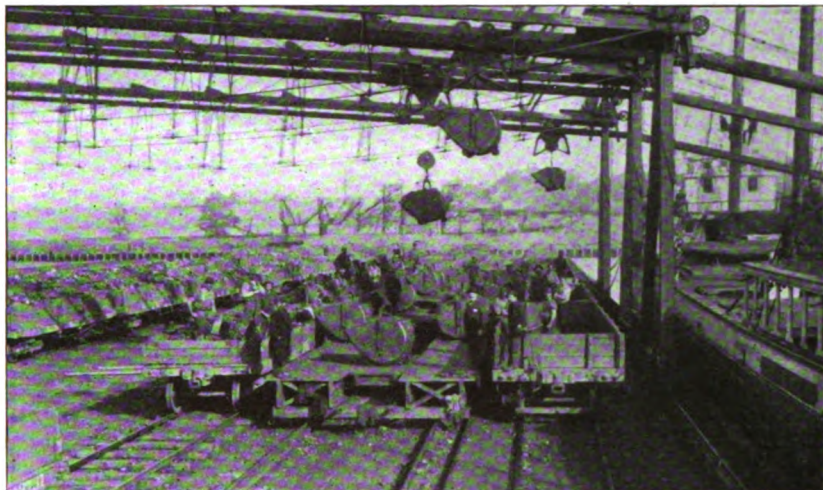
What is known as the Portables dock, was constructed in '85. It was equipped with eight machines, which operate on the same general plan as the Browns, but two burned and there are only six now. This dock is still in operation, and it is also equipped with Hulett grab buckets.

The coal trestle went out of commission in 1903 and the McMyler car dump on the lake front was put in operation in 1904. This differs from the Pittsburg Coal Co.'s McMyler, the machinery being on the ground.

There are twelve machines on each side of the P. Y. & A. slip.

All of the docks at Ashtabula are operated by outside interests, who lease from the Pittsburg, Youngstown & Ashtabula Railway Co. and the Lake Shore & Michigan Southern Railway Co. Mr. D. F. Flower is agent for the former, and Mr. J. P. Manning for the latter.

On the Lake Shore side of the harbor, Superior docks Nos. 1 and 4 are operated by the United States Steel Corporation with Mr. J. E. Savage as superintendent. Dock No. 2, No. 7 or the Ashtabula clams and the McMyler car dump are operated by the Ashtabula Dock Co., with Mr. E. S. Henry as superintendent. Dock 3, or the Angeline; dock 5, or the Union, and dock 6, or the Mahoning & Shen-



BROWN COAL LOADERS IN OPERATION ON THE STEAMER GEORGE SPENCER.

port machines were used to unload the ore. Four of the machines had been imported from Erie in March, '73. They were carted from the up-town depot to the harbor.

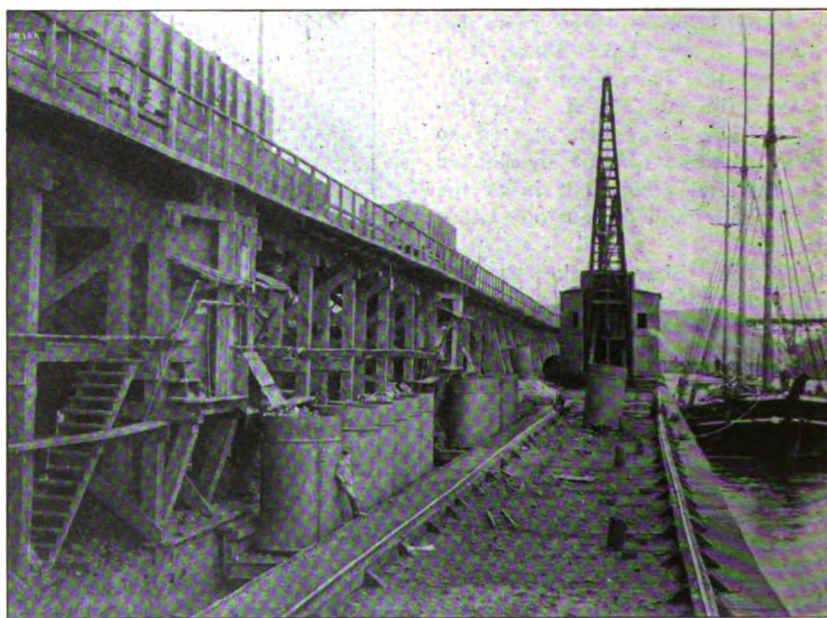
In the fall of '73, a dredge was brought from Erie to dredge out the P. Y. & A. slip, where No. 2 and No. 3 docks were built. These are now known as the Kings and Fast Hoist docks. The Kings, or No. 2 dock, was ready first, and the four Lockports were moved round the end of the dock and put in place there. It was not till 1876 that the slip was being operated full blast, both sides being complete then. Three more Lockports were then secured.

Just exactly how long the Lockports were used is not known. When business was rushing in the slip, boats were unloaded on No. 1 with horses and wheelbarrows. A few years later, a man was sent from Cleveland to erect two long wooden trestles running east and west on No. 1. These were operated like the Browns, and must have been the first attempt at the modern conveying machines. They were only used two years.

In '82, the McMyler "whirlies" were put on the slip docks, and the Lockports were moved to No. 4 dock, which was located where the car ferry slip is now, just back of the Fast Hoists. It was afterward called 4½. It was originally an ore dock, but was soon used for coal. The Lockports, ring-arounds or grasshoppers, and a trestle were all used on this dock. The trestle with big cylindrical buck-

long inverted booms which were operated by steam. Whirlies were afterward put on No. 1, and later moved on a scow to the Haskell dock.

The P. Y. & A. slip docks, Nos. 1 and 2, first had Lockport machines, then McMyler whirlies and then King machines, similar to the Browns. The latter were put up about 1890. In the



M. A. HANNA'S 4½ DOCK WITH COAL TRESTLE, MCMYLER WHIRLIE AND BUCKETS OPENING AT BOTTOM FOR LOADING BOAT.

early eighties, this slip had a coal chute at the upper end for fueling boats. The Kings and the Fast Hoists are now equipped with 2-ton Hulett grab buckets and Andrews

ango, are all operated by W. G. Pollock, of Cleveland, with Mr. J. H. Burton as superintendent. The latter is also superintendent of dock 5½, or the Pittsburg Coal Co.'s McMyler car

dump. Mr. Jay M. Amsden is superintendent of the four P. Y. & A. docks operated by M. A. Hanna & Co.

The men who operate the docks are as follows:

Superior Docks Nos. 1 and 4.—Master Mechanic, H. G. Gary; Chief Engineer, C. E. Cahoon; Ass't. Master Mechanic, J. Irwin.

Foremen.—C. C. Wilson, B. J. Palmer, W. E. Kennedy.

Hoover-Mason firemen.—S. J. Urch, J. B. Van Pelt.

Hoover-Mason Operators.—J. Clint, J. Duffy, J. P. Findley, F. Gage, A. C. Howard, A. N. Johnson, G. Lewis, T. Miller, O. H. Perry, N. Swanson, H. Van Pelt, E. M. Ward.

Engineers.—A. Anderson, F. B. Ashley, E. Andrus, W. Brazie, A. D. Bowen, J. Bourkland, A. L. Bailey, A. W. Brazie, W. Baird, W. Cook, D. O. Collar, W. Cook, C. J. Casbourne, H. W. Campbell, R. Cook, V. Denslow, T. J. Elliott, W. Grasmehr, A. M. Howard, E. Hjelm, H. W. Hutchinson, W. S. Hewins, R. Hegfield, L. L. Hopkins, W. Hewitt, C. L. Higgins, J. Johnson, E. Jeffords, J. Kusik, H. Lukala, C. Laskey, H. W. L'Hommiedieu, C. Lawrence, H. S. McNutt, R. F. Massena, J. A. Nettleton, A. E. Nelson, E. Pyburn, F. W. Rogers, L. L. Seymour, J. Stearns, H. T. Stearns, P. E. Seamens, A. L. Strickland, I. Spaulding, C. Strauss, H. A. Sprague, M. Sherry, F. R. Scott, J. Thompson, E. Whitlam.

Gang Foremen.—C. Anderson, J.

Trimming Foremen.—E. M. Burnett, A. Pomare.

Watchmen.—C. Parnell, P. Sherry.

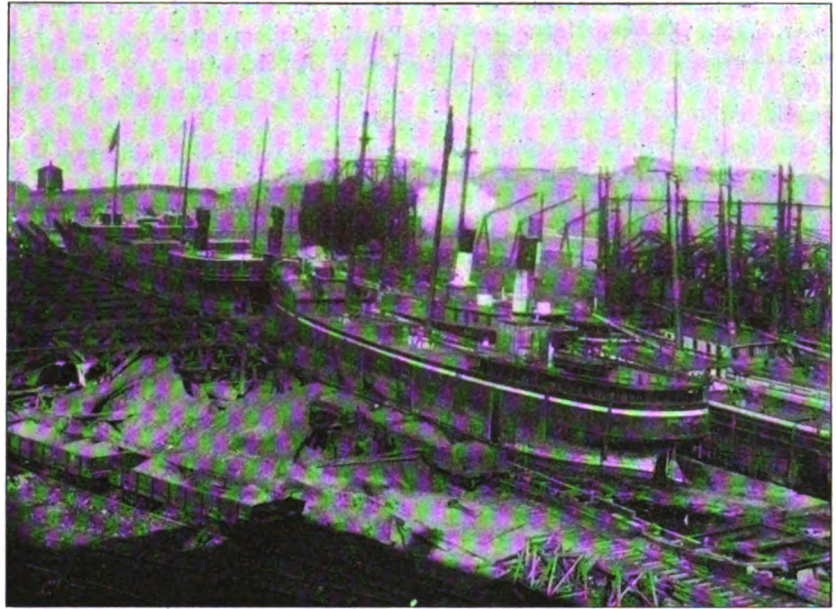
Blacksmith.—L. S. Sharp.

Blacksmith Ass't.—F. E. Shepherd.

Chief Clerk.—G. H. Savage.

Burns, assistant foreman; A. Linkerson, coal dock foreman; E. E. Williams, chief engineer; F. Whitman, J. A. Swap, assistant chief engineers.

Ashtabula Dock Co. clams.—S. T. Cook, foreman; operators, M. Shan-



P. Y. & A. SLIP SHOWING COAL CHUTES FOR FUELING AND A NUMBER OF OLD-TIME STEAMERS.

Clerks.—A. A. Larson, E. W. McClanning, L. C. Wilderson.

Machine Testers.—G. E. Carlson, R. E. Wason.

Number Takers.—C. Flynn, E. Punderson, J. Sherry, H. Urch.

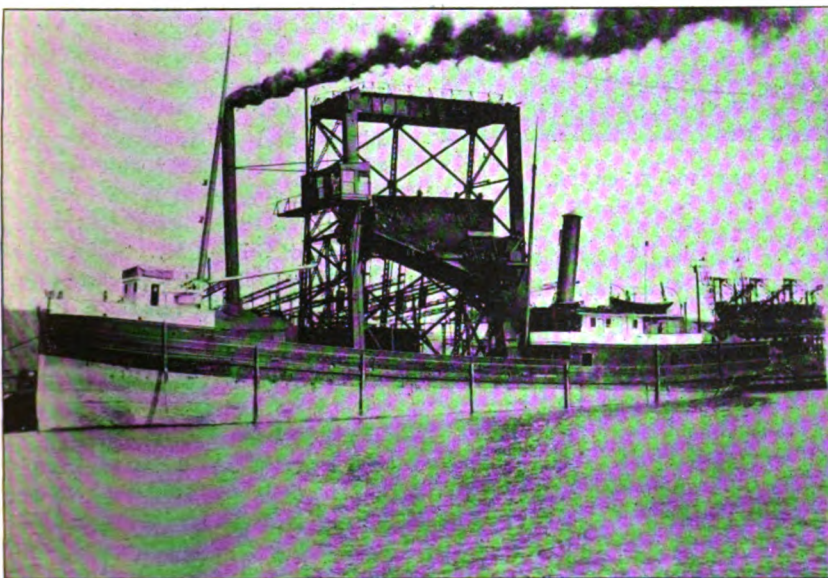
Water Boys.—E. Sherry, W. Story.

non, F. Fitch, W. R. Clawson, W. Hoose, H. O'Brien, engineer; C. W. Smith, fireman; M. Benson, R. Hegfield, oilers.

Ashtabula Dock Co. Brown hoists.—F. M. Burns, foreman; A. Mapous, blacksmith; J. E. Hall, blacksmith helper; F. Whitman, engineer; C. H. Talcott, electrical engineer; C. H. Bartram, electric lineman; engineers, James Dovan, J. Lewis, C. W. Briggs, Ole Johnson, E. Hummer, J. King, M. Rendrick, J. E. Palo, C. Welsh, A. Tobias, F. Salca, R. Laskey, G. Daniels, E. J. Kittinger, J. Mello, P. D. Clair.

Ashtabula Dock Co. car dump.—A. Linkerson, foreman; J. A. Swap, operator; E. Cowan, pig operator; O. J. Nevison, chute operator; C. D. Fox, engineer; D. Otto, fireman.

Angeline docks.—P. H. Hageney, chief engineer; Morse Powers, assistant to chief engineer, Mike Driscoll, foreman; Emmet Weldon, engineer in charge; Luke Mills, blacksmith; R. Bissett, blacksmith helper; Con Driscoll, night watchman. Engineers.—Charles Stewart, Mike Driscoll, Sam Clint, John Hageney, Edward Duffy, Tim Murphy, F. L. Croden, Al Finley, George O'Brien, John Mahoney, John Norton, John Rasey, Harry Thompson, James Clint, Fred Colson, Charles Robinson, James Vossalier, Anthony Smith, Wm. Eldridge.



PICKANDS, MATHER & CO., MCMYLER COAL DUMP AT EAST SIDE HARBOR ENTRANCE.

Blasko, G. Cross, C. Dimarchio, D. Frabott, F. Larson, J. Mello, G. Musik, J. Motsko, G. Musik, Jr., S. Nelson, J. Olson, J. Tobias, H. Thompson.

Ashtabula Dock Co. office force.—C. E. Hebard, assistant superintendent; F. H. Burnett, cashier; J. Konrad, ore clerk; H. C. Henry, coal clerk; S. F. Cook, foreman; F. M.

Mahoning & Shenango docks.—H. Harps, foreman; S. W. Taylor, engineer in charge. Engineers.—John Madden, John Keenan, Tim Glazier, A. C. Frazier, Robert Sidley, Giles Hawkins, Mike McKernan, Luke Kelly, Ed. King, S. W. Masten, A. J. Brewer, Wm. O'Brien, Harry Harps, Fred Melspauagh, George Brown, John Sherry, Richard O'Brien. Charles Driscoll, night watchman.

Union dock.—M. H. Harps, Tom Doyle, foremen; Wm. Lewis, engineer in charge. Engineers.—Michael Kelly, Tom Hassett, Frank Cahill, Nick Connick, Tom Clair, Wm. Way, John Bowler, Ed Culliton, James Bowler, James Cose, Joe Keenan, Frank Eddy, Frank Webber, Charles Alfred, Wm. Finley, James Keenan, James Cartner, Gus Olson, Louis Martin, William Driscoll, William Madden.

Pittsburg Coal Co.'s dock.—J. P. Manning, Jr., O. E. Skoog, foremen. Engineers.—C. D. Faulkner, Charles Devereaux, John Condon, W. L. Hageney, Frank McGraw, James McDermott, Wm. Hackett, George Hennegar, William Pollock, F. J. O'Rourke.

Fueling Scow Black Diamond.—Captain, Wm. E. Mallory; engineer, John Joyce. Firemen, Richard King, Frank Rowan, Elmer Alfred; tunnelmen, James Ross, Alfred Reno.

Angeline, Mahoning & Shenango, Union and Pittsburg Coal Co.'s docks office force.—J. M. Kennedy, cashier; C. C. Driscoll, general foreman; P. H. Hageney, chief engineer; R. W. Dingee, O. J. Dingee, C. H. Irwin, E. S. Harps, E. L. Walkley.

Pittsburg, Youngstown & Ashtabula Ry. Co. docks.—Clerks, D. W. Reed, M. P. Tyler, L. S. Sherman, W. E. Berry, C. H. Hampe; foremen, T. H. Daly, general, John Swedenborg, Tom Scott, C. F. Daly, L. G. Garrison, Fred Gillette, W. L. Palmer, F. O. Collar; number takers, A. B. Collar, Lee Streeter; F. H. Schlegelmilch, master mechanic; Geo. Swedenborg, assistant master mechanic; machinists, E. C. Askew, Dan Sutter, W. D. Stearne, John Makynen, Jr., Cliff Brown; blacksmiths, J. Tenhonen, Oscar Johnson, J. Wists, J. Hyverinen, W. H. Brown, J. Tuamala, E. Hakkio, Matt Tuamala, Andy Maki; carpenters, F. G. Crozier, Geo. McCarty. Fueling Scow (Geo. B. Raser).—Captain, S. A. Cline; engineer, Ed. Ball; firemen, Alex. Peterson, E. J. Ball; watchman, H. Rintoo.

Wire gang.—J. Wallender, G. R. Elliott, Carl Gustafson, Thos. Blair, Isaac Hautamaki, Henry Johnson.

Power Plant.—Electricians, Geo.

Hamm, A. Freed; engineers, L. C. Whelpley, Geo. O'Keson firemen, J. Toppari, J. Raitto, E. Neami, L. Honninen.

Motormen.—F. Burpee, F. Olin, Chas. Scott, J. Maunus, Lynn Olin, Harry Barrett, Mart Garrison, Victor Russki. Oilers on Kings.—O. Helder, J. Tapala. Oilers on Fast Hoist.—Portables.—H. Korkalti, Isaac Karpakka.

King Machine Engineers.—D. C. Randall, A. S. Keep, C. H. McNutt, N. Johnson.

Hoisters.—J. Stanley, A. P. Freed, W. C. Williams, F. M. Seymour, R. White, H. E. Bartlett, C. P. Calloway, F. B. Wetmore, John Hakla, E. Whelpley, P. Carlson, D. H. Reed, D. D. Harley, W. C. Andrews, W. H. Braughton, Chas. Olson, H. M. Bart-



EDWARD E. GILLEN.

lett, J. Sippola, Oscar Lauttanen.

Fast Hoist Operators.—E. Muhlhan, G. H. Crawford, W. A. Stewart, Andrew Johnson, E. Rantala, M. Mampaa, Victor Kosky, M. Joki, A. Kottla, M. Witto, John Mietty, J. Kyryi, C. Longhed, John Juhola, J. Orquist, J. E. Bakkala, O. Ronberg, Eric Aho, K. Makala, E. Arkelander, A. Krook, P. Heikkury, John Killiner, Herman Hapala.

Portables.—Engineers, Con Sullivan, W. Russell, N. W. Brazie. Hoisters, T. Baldwin, T. Tarbell, Pete Jepson, J. Sanborg, Alfred Freed, Guy Mills.

Coal dump.—N. Swedenborg, Ed Hakala, P. Coyne, Wm. Coyne, J. Ketcham, J. Starra, Chas. Brown, J. Carlson, J. Makynen, J. Karhu.

EDWARD E. GILLEN.

Edward E. Gillen, of Racine, Wis., who is vice president of the Edward Gillen Dock, Dredging & Construction Co., is probably the youngest man on the lakes engaged in such a responsible position. He, however, would have been a physician if his studies had not been interrupted by a serious injury to his knee. His teachers regretted his leaving them because he had stood at the top in his class, averaging 93 per cent in his first exams.

Mr. Gillen was born at Racine in 1877, and he went through the public grammar and high schools of that city. He graduated from these while quite young and then started in at the Physicians' and Surgeons' College at Milwaukee, resolved to be a doctor. His ambition was not realized in a medical way, but for the past six years he has been gaining fame around the lakes in his present capacity. He was just old enough to vote when he took charge of the Sheboygan breakwater construction in 1900.

In 1901, Mr. Gillen worked as assistant superintendent on the breakwater at Michigan City, Ind., going to Chicago when that was completed to assist in the construction of the Ship Owners' dry dock. In 1903, he began work on the 2,500-foot timber breakwater at Chicago, finishing it in 1904. In 1905, he was engaged in dock construction at Racine, the last two jobs being for his own company.

In August, 1905, Mr. Gillen was assigned to the biggest job of his short career, being sent to Ashtabula to supervise a \$200,000 contract for the Lake Shore & Michigan Southern railway and a \$400,000 government breakwater contract. This latter consists in laying 3,000 ft. of breakwater, 70 per cent now being complete.

Edward Gillen, Mr. Gillen's father, who is president of the company, has been in the business since the Civil War. He is now constructing a \$100,000 bridge at Racine.

J. P. MANNING.

One of the most striking figures in the business life at Ashtabula harbor is Mr. J. P. Manning, agent of the Lake Shore & Michigan Southern Railway Co. He is a wonderful specimen of the sturdy pioneer and he has been with the company so long, it really seems he must long since have become an integral part of it. He is really the "grand old man" of the port.

Mr. Manning is so close to the allotted three score and ten, he is likely

to pass far beyond it, but he is only just getting gray. It is with marvelous dignity and becoming pride that he will tell you he has been working for the Lake Shore a half century as its agent.

The United States was a wild and



J. P. MANNING,
Lake Shore Agent at Ashtabula.

comparatively unsettled country when young Manning first set his foot from the county Wexford, Ireland. He remained at Philadelphia till he was seventeen and then took Horace Greeley's advice and went west. His trip was of an exploring nature, because he turned eastward again and located in Ashtabula in '56. He started work with the Lake Shore then as telegraph operator and agent.

When the Civil War broke out, Mr. Manning's patriotism carried the day and he left his work to join the Nineteenth Ohio. He was a captain when mustered out, and as soon as he could turn homeward again, he came back to his old work, which was held open for him. It was a few years later, in '73, the first dock was built.

Mr. Manning remembers when it took several days to unload a 1,200-ton ore boat, the only means of doing it being wheelbarrows. He says a 1,200-ton boat in the old days was a whale, most of the schooners being half that size. According to him, the first efforts at handling ore and coal could not have been more crude. It was not till '76 the Lockport machines were installed.

When Mr. Manning came to Ashtabula it was nothing more than an inlet for the light-draught schooners which formerly plied the lakes. He admits that he never dreamed of its

becoming what it has. The old pontoon bridge and the "let-well-enough-alone" policy of those days looked good to him then and he did not claim to be a prophet.

"My ambition to see Ashtabula distance any ore-receiving or coal-shipping port on the lakes is to be realized," said Mr. Manning, "I will live to see the day when 15,000-ton boats will come in and discharge their cargoes. This will be a great contrast to the old 600-ton schooner."

TIMOTHY H. DALY.

Fifty years in the ore-handling business is the record made by Timothy H. Daly, general foreman for the Hanna docks on the Pennsylvania side of the harbor at Ashtabula. He began his career with Scott & Co., at Erie, in '56, and went to Ashta-



T. H. DALY.

bula the first year the railroads ran down to the harbor. He was on hand when the first ore cargo was received, and superintended its unloading.

According to Mr. Daly, the old schooner Maize, a full-rigged, three-masted ship, brought the first cargo of 730 tons to the old P. Y. & A. dock, which extended about 200 ft. south of where the Great Lakes Towing Co.'s office now is. She was worked out July 11 and 12, 1873, with two of the old Lockport machines. He says this was fast time. The P. Y. & A. slip had not been dredged then.

At this time the harbor entrance consisted of an east pier which extended out to a little beyond where the Pickands, Mather & Co. coal dump is now. In fact, Mr. Daly says, the original P. Y. & A. dock was used

for two years before the slip was dredged out and put in operation. In those days the leviathans of the lakes were the Havana, Sparta, Helena, Sumatra and others. Cargoes of 1,200 tons were enormous then.

Unloading with Lockport machines, according to Mr. Daly, was continued in the P. Y. & A. slip, and horses, tubs and wheelbarrows were used on the old dock when the cargoes became too numerous for the slip. A line was rigged aloft and attached to a tub, the horse pulling the tub up at the other end of the line by means of a snatch block. The tubs were dumped into wheelbarrows and wheeled ashore.

Mr. Daly started with the P. Y. & A., July 7, 1873, going with Rhodes & Co. in March, 1874, who took over the management of the docks. When M. A. Hanna succeeded Rhodes & Co., he worked along in the same capacity and he is in his old position now with the M. A. Hanna Co. His work has become more extensive with the change of time and managements.

C. C. DRISCOLL.

Some of the men in Ashtabula have been there so long they have become what might be called an integral part of the town. Cornelius C. Driscoll, general foreman on the Lake Shore side of the harbor for all the docks but those operated by Pickands,



CORNELIUS C. DRISCOLL.

Mather & Co. and the United States Steel Corporation, is one of them. He was on hand in '73 when ore was wheeled off the schooners and coal was wheeled on; in fact, he used to turn to with a wheelbarrow, himself.

The late Geo. B. Raser was Mr.

Driscoll's first employer in Ashtabula, he being agent for the P. Y. & A. and superintendent of the ore docks. He put Driscoll in charge of a gang on the old No. 1 dock, where the Lockport machines were first operated and where wheelbarrows were also an important factor in getting the ore from the boats to the dock.

Mr. Driscoll only remained with the P. Y. & A. for one season, starting in in 1875 with the firm of Andrews, Hitchcock & Co. on the Lake Shore side. His immediate superiors then were A. J. McKinney and E. S. Henry. He ran a gang for them till '79, when he was made general foreman. He has held this position ever since.

Mr. Driscoll is now in the employ of the Angeline, Union and Mahoning & Shenango ore docks and the Pittsburg Coal Co., but between now and his first employment with Andrews, Hitchcock & Co., he worked for Scott & Co., who operated at Ashtabula in 1885, later selling out to the Pittsburg Coal Co.

The changes in the methods of unloading ore and loading coal since Mr. Driscoll started in have been very rapid and interesting, but it is worthy of note that he delights in referring to and talking about the old days.

J. C. O'NEIL.

J. C. O'Neil's connection with the lake front improvements at Ashta-

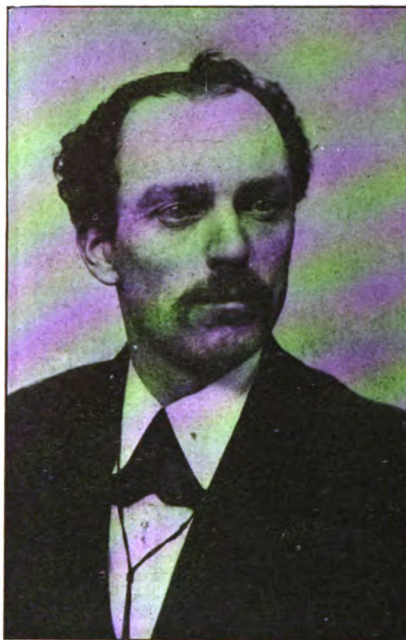


J. C. O'NEIL.

bula comes through his work as superintendent for the Standard Contracting Co., of Cleveland, which firm took the contract for pier and jetty work as well as making the big fill for the Pennsylvania. The excellent manner in which the work has been

done is attributable in a great measure to him.

In many ways, Mr. O'Neil can be called a genius, because he is able to turn his hand at almost any kind of work. He was earning a journeyman carpenter's wages at the age of seventeen, and since that time he has



P. H. HAGENEV,
Chief Engineer, Lake Shore Docks.

learned the trade of pattern making and molding and he has also served his time as a machinist. Not satisfied with this, however, he also turned his hand to submarine diving. All of this preparation helped him in superintending pier and bridge construction, which he has done mostly in recent years.

Mr. O'Neil's father and grandfather before him were contractors, his grandfather having assisted in building the first cathedral constructed in New York city. From this, it can be seen that the grandson has inherited his ability in his chosen line.

One of Mr. O'Neil's ways of keeping busy after working hours at Ashtabula was to build an 18-ft. gasoline launch to get around the harbor with in the course of his work.

P. H. HAGENEV.

P. H. Hagenev is one of several sons of Erin who made an early appearance at Ashtabula and remained there from the time ore was first received till now. He started his career on dredges at Erie, but went to Ashtabula in '79. He is now employed as the chief engineer of the Angeline, Union and Mahoning & Shenango ore docks and the Pittsburg Coal Co.'s dock.

When Mr. Hagenev started to work, the Lake Shore had two machines on the old No. 1 dock, which he says were called Noble & Hall machines. They were similar to the Lockports except that the latter hoisted and lowered away with a friction gear, while the former worked with a clutch. The Noble & Hall also had a double engine.

What is now known as the Union slip at Ashtabula, was dredged out the same year that Mr. Hagenev arrived. Seven Noble & Hall machines, he says, were installed on the dock which was built there, called No. 4. No. 2 and No. 3 docks were built in '73 and '74. They were installed with Hunt automatics. These docks were done away with some time later.

Mr. Hagenev's work has been of an interesting nature because he has been present to see the rapid evolution of the ore-unloading methods. Using a Noble & Hall machine in the old days was as primitive as could be, compared with the use of the Hoover & Mason clams of today.

J. P. FITZGERALD.

J. P. Fitzgerald, engineer in charge of the Pennsylvania's Ashtabula harbor lake front improvements, is a young man who has made his own way in his profession. He has become proficient by hard work. He started his career under the tutelage



J. P. FITZGERALD,
Engineer in Charge Pennsylvania Improve-
ments.

of the city engineer of his home town.

He spent seven years of his life working in all capacities at Ashtabula with the city engineer and then went

with the Pittsburg & Conneaut Dock Co. at Conneaut, going later to assist in the construction of the Sharon Steel Co.'s plant at Sharon. He afterwards joined forces with the Pennsylvania.

Mr. Fitzgerald worked on all kinds of railroad construction before taking up his present occupation and he has been supervising the lake front improvements since April 1, 1905.

EDGAR C. BOWEN.

Edgar C. Bowen, assistant engineer, who has charge of the Lake Shore's Ashtabula lake front improvements, was born at Fort Brown, Texas, and received his education at the Massachusetts Institute of Technology, graduating from there in '97. Almost a year later, he started active engineering work with the Northern Pacific railway on the construction of the Clearwater Short Line in Idaho.

Mr. Bowen took up work with the United States Engineers Corps at Duluth, May 4, 1899, and remained in that employ till February 15, 1906. In that time, he was in charge of the topographical survey at the headwaters of the Mississippi and in local charge of the river and harbor improvements at Grand Rapids, Mich., and Sioux City, Ia.

Mr. Bowen left the employ of the government while looking after river improvements on the Missouri river

has been working in that capacity since the death of the late George B. Raser in 1901. He had been connected with the Pennsylvania at Ashtabula for many years before this, however, having worked for twenty-seven years in the superintendent's office uptown. He was recently made agent for the carferry ser-



D. F. FLOWER,
Agent for Pennsylvania Railroad at Ashtabula.

vice established between Ashtabula and Port Burwell, Ont. He resides at the Harbor.

HOWARD E. SMITH.

Howard E. Smith, assistant United States engineer at Ashtabula, has been succeeded in that position by George S. Phelps, junior engineer, of Cleveland. Mr. Smith goes to Albany, N. Y., as division engineer for the New York canal commission. Before going, he was presented with a gold watch by the following who worked under him. W. C. McCreery, Thomas Horiham, Tom C. Frame, J. C. Wilson, George C. Young, John MacRae, O. C. Jones, Chauncey Goldsmith, of Ashtabula, and Wilson T. Howe, junior engineer, J. W. Haskins, Lee R. Goldsmith, Riffe Hodgkin, Robert Goldsmith, of Conneaut. Mr. McCreery made the presentation.

JOHN McLAUGHLIN.

John McLaughlin, proprietor of the McLaughlin Iron Works, which is located at 180 Center street, Ashtabula, formerly worked at the McKinnon Iron Works, but for the last three years he has been doing business in his own plant. He has a complete equipment for the repair work necessary on modern freighters, running

an iron and brass foundry in connection with his plant.

HARBOR TUGS.

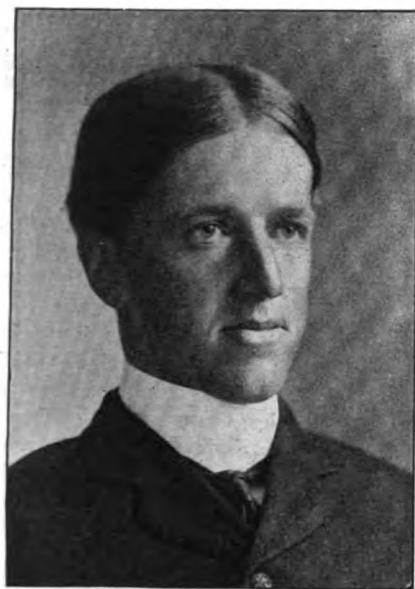
There are five tugs used by the Great Lakes Towing Co. at Ashtabula harbor. Capt. Whitney Carr is the local manager of them and E. P. Root, Jr., is the cashier in the office. The names of the tugs and officers are as follows: Fabian, captain, Dan McRae; engineer, M. Joyce; William D., captain, John Mack; engineer, J. C. Donovan; Thomas Wilson, captain, Tim Heagerty; engineer, J. M. Donovan; Sunol, captain, H. J. Coulter; engineer, M. O'Brien; L. B. Johnson, captain, W. J. Robertson; engineer, E. Cassidy.

HARBOR ENTRANCE.

Ashtabula's harbor entrance is 450 ft. between the two concrete piers. It narrows to 315 ft. between the Pennsylvania and Lake Shore dock permits, and is 260 feet between the car dumps. The distance between the outer harbor piers and the new improvements is 1,200 ft.

CHIEF ENGINEER S. M. SYLVESTER.

Chief Engineer S. M. Sylvester, of the new carferry Ashtabula, has been sailing since he was 15 years old, and he has been holding down the after end of carferries since 1892. His first



EDGAR C. BOWEN.

to go with his present employers and work on what is known as the "Ashtabula dock extension."

D. F. FLOWER.

Mr. D. F. Flower, agent for the Pennsylvania interests at Ashtabula harbor,



CHIEF ENGINEER SYLVESTER,
Carferry Ashtabula.

work was as fireman on the old Northwest Transportation Co., a Canadian line. He went as first assistant in the Ann Arbor carferries and he first acted as chief in 1896 on Pere Marquette No. 16. He brought out the big Grand

Haven, Pere Marquette No. 18 and his present boat, the Ashtabula.

CARFERRY ASHTABULA.

Ashtabula's new carferry business is being taken care of by the magnificent carferry Ashtabula. She is 350 ft. overall, 330 ft. on the keel and has 56 ft. beam. She has twin screws with two sets of triple-expansion engines. Her



CAPT. B. T. HAAGENSON.

equipment is complete for work from one end of the year to the other, being designed to crush ice and having plenty of power to do it. Her licensed officers are: B. T. Haagenonson, captain; T. C. Smith, mate; A. J. Buchanan, second mate; S. M. Sylvester, chief engineer; Thos. Elliott, first assistant; Wm. Wenk, second assistant. The Ashtabula carries freight and passengers and is now maintaining a tri-weekly schedule.

HISTORY OF ASHTABULA.

Ashtabula's history dates back to the days of the red man; in fact the town bears an Indian name and will forever be distinguished from many others for this reason. The Indians named the river "Hashtabula," signifying "full of fishes," and the town has always retained the name. Every Indian name signifies some noted feature when given to towns or rivers or any part of nature. It is related that General Moses Cleveland, in 1796, tried to name the site, "Mary Esther," after his daughter, without success.

Much of the commerce of Ashtabula county was formerly concentrated at the harbor. The local merchants began by shipping lumber, timber and staves and then turned their attention to such utilities as

pork, beef, flour, potash, wines and whisky. Coincident with this latter trading, the boats plying up and down the lakes made it a regular point to take on and let off passengers and freight.

There are really two parts to the town, but both go by the one name of Ashtabula, the word harbor often being tacked on, however, to distinguish it from the uptown part. The first settlement of the two towns was made by Thomas Hamilton in 1801. He erected a log cabin above and on the west side of the harbor entrance. When he was building it the Austin family came in from the lake in a boat. Judge Austin gave him a hand in the construction. Hamilton soon after left the town.

The first family to settle in the place was that of George Beckwith, who moved from Austenburg in 1803. During the following January, Beck-



L. W. JARVIS.
Deputy Collector at Ashtabula.

with perished in the snow just beyond the town line between Saybrook and Ashtabula. He had been to Austenburg for provisions for his family and he was overcome on his return. A searching party found him. Mrs. Beckwith remained and she gained a livelihood by ferrying people across the river with a canoe.

Matthew Hubbard, of Trenton, N. Y., started for Ashtabula in 1804 as agent for his uncle, Nehemiah Hubbard. He left his home May 21, 1804, on horseback. He and his party reached the future port of Ashtabula, June 2, 1804. He found Mrs. Beckwith and her two daughters and a Mr. Thompson and his wife. They were the only settlers between Con-

neaut and the west line of Harpersfield, a distance of thirty miles. June 3, he selected a farm site and decided where he would build his cabin.

An old history of Ashtabula says George Beckwith built on lot 4, fractional town 13, range 3. Hubbard and Pierce erected a cabin in June, 1804. Pierce accompanied Hubbard on his trip from New York. A third cabin followed Hubbard's the same month. Samuel Beckwith arrived later and erected another cabin, but he left again and Hubbard and Pierce were then monarchs of all they surveyed, the solitary red men being their only companions. They had between them a yoke of oxen, a cow and mush pot, some flour and corn meal, and a few rude utensils.

As far back as 1812, log cabins were the rule in and about Ashtabula and the harbor. In 1837, some effort had been made to improve conditions and the town became known as a place to trade. The merchants at that time were forwarding goods to Detroit, Chicago and Lake Michigan ports. Mart Watrous, grand uncle of C. H. Watrous, superintendent of the harbor postoffice, was one of the forwarding agents in those early times. The business done then was considerable.

From 1837 to 1861, Ashtabula continued her prosperity. Three railroads were projected but the Cleveland, Painesville & Ashtabula, what is now the Lake Shore, was the only one constructed. Efforts had been unsuccessfully made to build a road to the Ohio, but the project fell through for lack of capital. In 1870, the Pittsburg, Youngstown and Ashtabula road was chartered as the Ashtabula, Youngstown & Pittsburg and trains were running on it in '73. The Lake Shore trains were running in '52, but did not reach the harbor till '73.

United States mail was brought into Ashtabula over the Ridge road from 1808 to 1852. This road was first cut out by Conneaut, Harpersfield and Ashtabula citizens. John Metcalf, the first mail carrier, had such a wild and unsettled territory to cover, he was often obliged to sleep in the woods or in the Indian wigwams when night overtook him. The road from Ashtabula through Saybrook, Austenburg and other townships was the principal route south. The mail was later transported in stages over this same road, known in 1819, as the Trumbull and Ashtabula turnpike. Gideon Leet, Matthew Hubbard, N. Hubbard, John Booth, E. C. Root, Henry Harris and J. F. Sexton were the first postmasters.

John Metcalf, Wm. Whitman and Calvin Cole were the first carriers.

The harbor at Ashtabula has grown big from a small beginning. In 1824, an act was passed by the Ohio general assembly incorporating the Ashtabula Harbor Co. In 1826, congress appropriated \$12,000 to remove ob-

structions, across from the old "yellow warehouse," and the second was a pontoon bridge. John Thayer, who lives on Thayer's hill, tended this for several years. It stood where the swing bridge now is. It had a 58-foot draw. Later it was widened to 102 feet. The present bridge, erected in

their appearance, there were docks above the bridge and such boats as the R. J. Hackett, Forest City, Bar-num, Havana and Sparta made regular trips to Ashtabula. They were light-draught, however, compared to the present freighters, which require at least 19 feet. One thousand-ton boats were big in '73 and 10,000-ton boats are not the largest now.

Ashtabula leads as an ore-receiving port, but she had a later start than other ports. It was not till '73 that ore-receiving was begun. T. H. Daly relates that June 25, 1873, the schooner C. H. Walker was loaded with coal. He and a gang of men were imported from Erie to do the loading. It was wheeled on at the P., Y. & A.'s old No. 1 dock. The first ore was taken off at the same dock July 11 and 12, 1873, from the schooner Emma Maize. She came in July 10. Wheelbarrows were used for the first and Lockport machines for the second operation.

Up to 1875, the total amount of money appropriated for harbor improvements was \$261,497.71. In that year, the west pier was extended 300 feet and a clear depth of 16 feet was obtained. Dredging had become an art then, however, for Capt. Dan Mitchell says the government used to have a scow drill that worked by horsepower in the same way that a pile driver works. The advent of the railroad changed the whole course of events. The total amount expended by the government for all purposes up to June, 1905, has been \$1,004,818.90.

Last year, the port received 6,401,740



LIFE SAVERS AT ASHTABULA.

Capt. Charles Anderson, standing; Gust Peterson at left; William Fields, Irwin Hinman, Earl Delavan, Francis Mallette, Earl Whelpley and Delancy Poole.

structions, Colonel Matthew Hubbard being appointed superintendent. The east pier was commenced in that year. In 1827, two parallel piers, 214 feet long, were constructed, down to a 10-foot depth. These were afterwards extended to 960 feet. In 1833, the piers went out 1,284 feet in the lake, making a 145-foot channel.

In 1834, 13,000 tons of the underlying shale rock were removed so the channel could be made nine feet deep. In 1836, the lighthouse was put up. It was an affair with seven lamps, which burned sperm oil. Before that a lantern was hung on a post at the end of the east pier, where the Ashtabula Dock Co.'s car dump now is. In 1876, the lighthouse was removed to the west pier. June 1, 1905, it was removed to the 50-foot square concrete pedestal at the new harbor entrance. Among some of the keepers, were Capt. Bigelow, Capt. S. C. Thayer, Seth Belknap, J. H. Oakley and the late P. H. Cheney. Capt. J. F. Crawford and F. J. Hartley, his assistant now keep it. It is what is known as a fourth order fixed red light with first class siren fog signal.

In the early days of Ashtabula, boats landed at the outer piers. The first bridge was a plank affair running

1889, has a 106½-foot draw. C. L. Scoville, an old resident and an old marine engineer, has tended it since its erection.

When boats first traded to Ashtabula, it was necessary to "scow"



ASHTABULA GENERAL HOSPITAL WHERE MARINE PATIENTS ARE CARED FOR.

freight to them out in the lake after they took on a certain amount. Capt. Dan Mitchell and Capt. James Calloway delight in telling about this. The former first shipped as mate on the old John Quincy Adams, an old time schooner. When steamboats made

tons of ore and 2,051,172 tons of coal were shipped. This year the increase in ore is already near the half million mark. In 1873, the P. Y. & A. docks received 15,027 tons of ore and the Lake Shore docks handled 1,180 tons in either '75 or '76. The records of

the Lake Shore were destroyed by fire and it is impossible to settle which year it was. Twenty years ago the total coal shipments were 201,048.

LAUNCHES IN THE HARBOR.

One of the most important features of the marine business at Ashtabula harbor is the launch trade. Each of the

McKINNON IRON WORKS.

Detroyed by one of the most disastrous fires which have visited Ashtabula in many years, the McKinnon Iron Works is to be rebuilt on a scale more pretentious than ever before. Larger buildings are to be erected, and they will be ornamental as well as useful, so their erection will



LAUNCHES OF THE SUPPLY HOUSES IN THE RIVER, 1906.

marine merchants have either one or two launches to deliver ship chandlery and supplies aboard the boats. In the accompanying picture, are launches owned by the following: Topky Brothers, McKinnon Iron Works, E. S. Miller, P. H. Cheney

improve the appearance of the east side of the harbor.

The machine shop is to be 50 x 100 and will extend nearly to the river from an 18-ft. alleyway in the rear of the new blacksmith shop, running east and west. It will be a steel frame affair and will have a track and traveling crane running its entire length and out to the dock.

The blacksmith shop will face on Columbus street. It will be a one-story brick structure 45 x 100, with a slate roof. It will be erected on the ground where the old one stood. The oil house, built entirely of concrete is to abut on the river and will be put up just north of where the old one stood. It will be 25 x 75.

The office and supply house, a two-story brick building, is to have a 30-ft. frontage on Bridge street and 100 ft. on Columbus. It will be built on the street level and it is expected will be ready in a month. The other buildings will be completed by the first of the year.



THE NEW LIGHTHOUSE AT ASHTABULA.
Courtesy Mrs. F. D. Brown.

Sons, H. S. Williams, G. F. Sheldon, T. J. Rennick, E. H. Burrill and the Gillen Dock Dredging & Construction Co. These launches are busy from morning till night. They transport thousands of dollars of merchandise every season.

ASHTABULA'S SHIP BUILDING IN EARLIER DAYS.

Ashtabula has been famous in earlier times as a ship building port, and it seems to have been only for reasons beyond her control that this prominence was not continued. However,

some of Lake Erie's trimmest schooners took their initial dip in years gone by at Ashtabula.

The Tempest, built in 1814 by B. A. Naper, was undoubtedly the first schooner launched at Ashtabula. She was afterwards wrecked and, according to town history, there were strange fatalities connected with boats built after she was. Men were drowned when the boats were launched or the schooners were wrecked. The schooners General Jackson, Superior, Elisha Whittlesey and Parrot and the steamer Washington were all pursued by a hoodoo.

The Whittlesey, which was sunk with two of her crew and six passengers, was afterwards rebuilt in 1834. The Parrot, which was chartered by Wm. Humprey to transport hogs to Detroit, went down with all on board. The steamer Washington, an old-time side-wheeler was burned on her maiden trip east with the loss of sixty lives. The schooner Superior blotted out several lives by capsizing when she was launched.

A. Harmon, J. D. Hulbert, Henry Hubbard and Capt. G. A. Thayer were all directly connected with ship building on the lakes. One of Harmon's crack boats was the schooner Atlas, built in 1834. Hulbert and Hubbard rebuilt the James Willis, sunk near Geneva, and they owned the Oneida, Plow Boy, Snow Drop, Jessie and Boston. All were managed by Capt. G. A. Thayer.

The following is a list of boats built at Ashtabula: Tempest, 1814; Elizabeth, 1815; General Jackson, 1816; Eagle, 1818; Superior, 1818; Traveler, 1819; Columbus, 1826; Telegraph, 1828; Elisha Whittlesey, 1829; Nehemiah Hubbard, 1831; Warren, 1833; Parrot, 1833; Atlas, 1834; G. S. Willis, 1834; steamer Washington, 1837; schooner Adelaide, 1838; Windham, 1842; sloop Emma, 1844. Between the years 1844 and 1868, were built the schooners Bennington, Cadet, Porter, Dahlia, Signal, Chief Justice Marshall, Pilot, Constellation, Oleaner, Joshua R. Giddings, Chicago. Ashtabula, Adriatic, Sioux, Gray, B. F. Wade, New Lisbon, Arctic, Oneida, Mary Collins, Boston Plow Boy, Jessie, Snow Drop, Julia Willard, Wind and Wave, Edwin Harmon, Mosher, Vampire Mermaid, Perry White and the tug McLellan.

J. G. Laird & Son's and H. J. Devney's ship yards, which are modest reminders of former busy days, are located north of the bridge on opposite sides of the river.

LAKE ERIE AND OHIO RIVER SHIP CANAL FROM ASHTABULA TO PITTSBURG.

This important work has now reached the point where preparations for construction should come about in a very short time. From Mr. George M. Lehman, chief engineer for the

ship canal company to be organized and to operate over the route as indicated on the accompanying map. The committee realizing the national importance of the canal project, had a

cured in Pennsylvania, and later one in Ohio.

The national charter, after some years of effort, was passed in a most satisfactory manner by the house



canal company, the following information is given:

"The canal project has advanced by stages until it is now on the verge of a reality. About ten years ago, under the auspices of a committee of the Chamber of Commerce, of Pittsburgh, surveys and estimates were made and laws passed both in Pennsylvania and Ohio, authorizing a

bill introduced in Congress which would authorize the building and operating of a canal, between Pittsburgh and a point at or near Ashtabula, Ohio.

In the forepart of last year, due largely to progressive measures taken by the Merchants and Manufacturers' Association, of Pittsburgh, a company was organized and a state charter se-

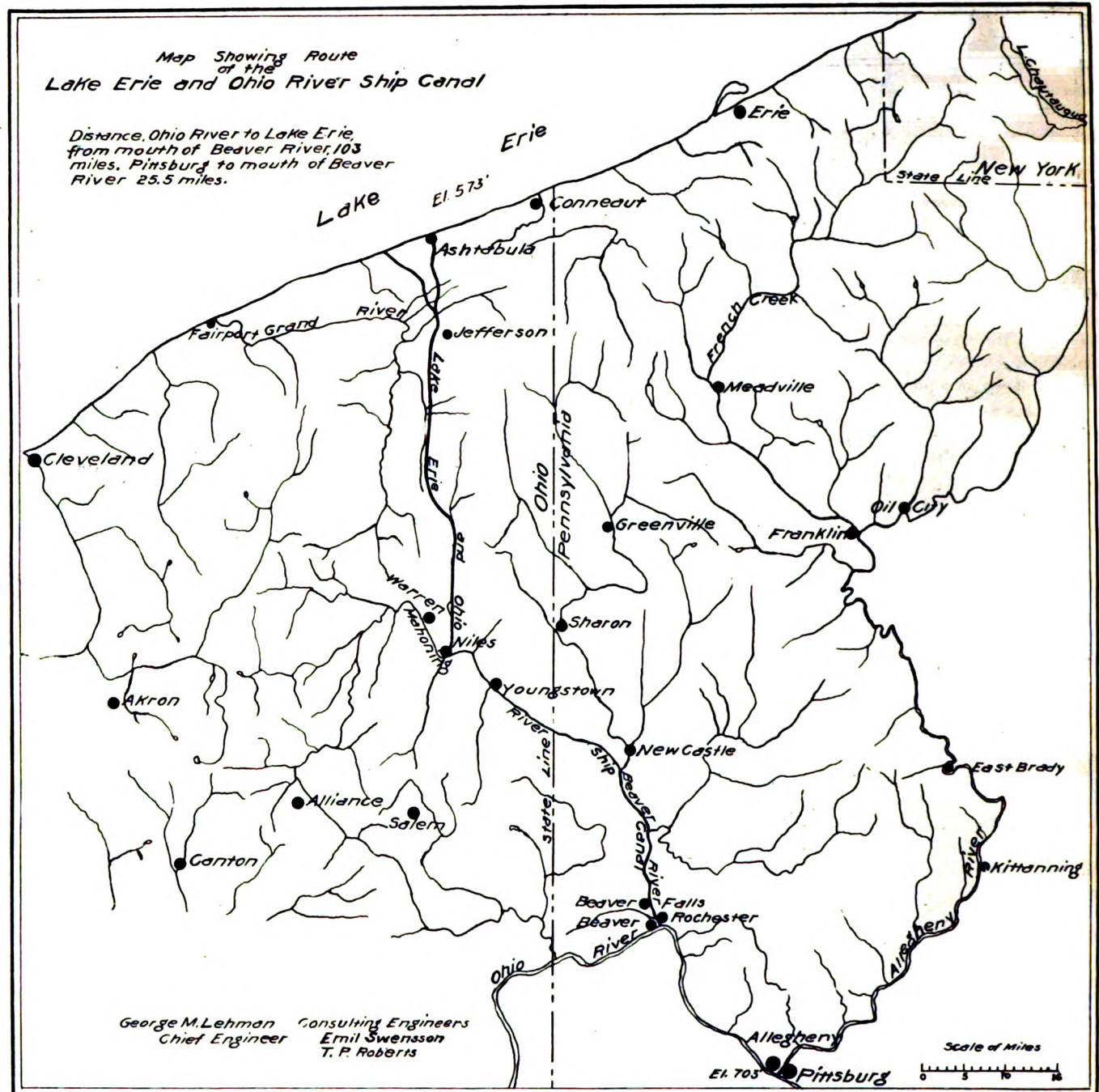
and senate at the last session of congress. Mr. John E. Shaw, president of the canal company, in addressing the committee, brought forth with such convincing facts the immeasurable benefits to be derived by the general public by the construction of this great waterway, that the eyes of the members of the respective committees, coming from

various parts of the United States, were opened to the national importance of the project and favorable reports resulted—but not before every feature of the bill had been investigated and certain amendments made. Much discussion followed the introduction of the bill in the senate, but

with its large industrial centers, connected with Pittsburg and the Ohio river, by a waterway—thereby accomplishing at one stroke, by a ditch about 50 miles long, and 50 miles of canalized river, the union of the greatest tonnage producing inland waters to be found anywhere upon

communication between a countless number of cities, and the whole making possible a more rapid growth to many communities now lying dormant.

The Erie canal, through the heart of New York state, will give connection with New York City, the Well-



it finally passed with an overwhelming majority.

Congress having heretofore ignored, or acted with indifference, became intensely interested and really observed for the first time, after reviewing engineering and commercial reports bearing upon the subject, what it means to producer and consumer of a large part of this country by having the great lakes,

the face of the globe, by the cheapest form of transportation known to mankind. The notable result is the bringing together of the vast iron ore fields of Lake Superior, with the matchless coal deposits of the Pittsburg district, which is at the same time the iron and steel center of the world, with 5,000 workshops. Building materials of various forms will likewise be brought into cheaper

and canal with the St. Lawrence river canals, and the Mississippi river with New Orleans and the Gulf, and finally by Panama a canal to the Pacific coast.

Mr. John Dalzell, who presented the bill in the house of representatives, aptly remarked, "If you will glance a moment at that portion of the map which embraces the great lakes, the sources

of the Ohio, and the territory adjacent to both, you will see two regions of magnificent natural wealth, the one the complement of the other, but separated by a space not great in fact, but great enough to strip either region of the value for which it is dependent upon its partnership with the other." "If now you will place the Superior ore fields alongside of the Pittsburg coal fields you will have the factors of an industrial sovereignty that will challenge the world to produce its equal."

When the canal bill reached President Roosevelt he took special pains to look into the merits of the project—its commercial importance, not only to the belt of country through which it will run, but to the country at large and the personnel of the promoters. The examination being satisfactory the bill was promptly signed and has become a law.

As a matter of history, it may be interesting to note, from Bauseman's "History of the Beaver Valley," that as early as the year 1755, Lewis Evans, a pioneer of the upper Ohio valley, remarked that the Beaver river and its branches offered facilities for opening a canal from the Ohio river to Lake Erie, and that this would be done some time in the "Future Ages." George Washington, in 1788, also spoke of the advisability of connecting Lake Erie with the Ohio river by way of the Beaver and thence to the Cuyahoga river. He questioned, however, if there might not be a more direct route of communication than by the latter route. In 1833, the first division of a canal, of small draft, was completed and afterward extended to Lake Erie at Erie, Pa. This canal passed over a summit of 1,082 feet above tide, had 133 locks, and a total lift of 936 feet. In 1872 the old canal property was sold and its bed partly occupied by a railroad.

The provisional committee of the Chamber of Commerce, of Pittsburg, had extensive surveys made which demonstrated beyond doubt the feasibility of the canal from an engineering standpoint, and the commercial advantages. The following gentlemen composed the board of consulting engineers: General Henry L. Abbott, at the time just retired from the engineer corps of the army, and recently a member of the advisory board of the Panama canal, and an authority both in this country and abroad upon canal matters and works pertaining thereto; Prof. Lewis M. Haupt, who was a member of the Nicaragua Canal Commission, and Mr. N. H. Hutton, of the harbor

board of Baltimore. The consulting engineers, now acting, are Mr. Emil Swensson, member American Society of Civil Engineers and Mr. T. P. Roberts, both of Pittsburg.

The project at this time proposed a canal, 15 feet deep, direct from the harbor of Pittsburg, paralleling the Ohio river for a distance of about 25 miles, and entering the Beaver river above its junction with the Ohio, making the entire distance to the lake, 128 miles.

The government slackwater improvement of the Ohio river, from Pittsburg to the mouth of the Beaver, with a fall of 35 feet, is now about completed, and will give a depth of nine feet, but it is known that this can be readily increased to 12 feet, and that it would unquestionably be done, immediately upon or before the completion of the Lake Erie and Ohio river ship canal.

The canal company, during last year, had a location survey made upon which it can build. These surveys verified the work done in 1895, have furnished additional information, and made sure that the project is free from insurmountable obstacles. It has come to be known that there is no route of practical value, outside of the belt of country through which the one in question extends, for a ship canal connecting the upper Ohio river and Lake Erie. This route, beginning at the Ohio from the government slackwater, will ascend the Beaver, and thence the Mahoning to the vicinity of Niles, Ohio, and thence in almost an air line to Lake Erie; entering the lake at or near Ashtabula.

By reference to the map it may be seen that New Castle is close to the main canal, and will be reached by a short branch, by canalization of the Shenango river, and by this means Sharon can be connected by an extension of about 20 miles length. Youngstown is directly on the line of canal. This whole district is prominent in the manufacture of steel.

The total lockage will not exceed 560 feet, and may be only 479 feet, with 24 lifts, up and down. In the latter case the summit elevation will not be greater than 860 feet above tide, 287 feet above Lake Erie, and 157 feet above the harbor of Pittsburg.

Modern canal engineering, recognizing the superiority of wide channels, it is proposed to have a minimum bottom width of 130 feet, with a depth over lock sills of not less than 13 feet, and probably 15 feet to correspond to the New York state canals and those of Canada. The

width will be 22 feet greater than the recently enlarged Suez canal. It is not to be understood, by any means, that all of the engineering problems will be of simple character, but it may be said, from a physical standpoint, that to connect Pittsburg and the Ohio river with Lake Erie, nature favors the project and could have made little improvement had she specially placed the Beaver and Mahoning rivers for the purpose, and this is also true, to a large extent, for the country beyond. The natural elements necessary for the project have been assembled in great harmony—it remains for man to make the proper use of them.

A question of great importance to a canal is the water supply; to be conservative the sufficiency of this to meet the demands of an annual business of 25,000,000 tons has been fully established, and for an increased tonnage additional storage reservoirs and feeders can be readily provided. While a large portion of the supply can be direct, it is the purpose to serve to the summit largely from storage water, the water being collected during periods of high water, and brought from streams within easy reach. The rivers will be largely benefited by having returned to them, an enormous quantity of water, during the canal season, a part of which time the streams now frequently suffer from the want of it.

As the prospectus for preliminary financing has not been completed it would be out of place to go further into details in describing the project at this time. It is finally the purpose to prepare a full description of all important engineering and commercial features.

Capt. Edward D. Gatfield, who has been mate of the Shenango Steamship Co.'s new steamer William P. Snyder since she came out in the spring, took command of her at Ashtabula on Tuesday. Capt. Henry Peterson, who brought out the Snyder, leaves her to superintend the construction of the new boat ordered by William P. Snyder, of Pittsburg. Capt. Gatfield is a son of Capt. William Gatfield, of Amherstburg, Ont., and he has a host of friends who wish him well in his new position.

Capt. James Doner, master of the steamer William Livingstone, made his initial appearance at Ashtabula this week, unloading at Superior No. 4 dock. Capt. Doner is well known in Ashtabula, and his friends were glad to see him.



DEVOTED TO EVERYTHING AND EVERY
INTEREST CONNECTED OR ASSOCIATED
WITH MARINE MATTERS ON THE
FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Co.

CLEVELAND.

BOSTON	NEW YORK
DULUTH	PHILADELPHIA
CHICAGO	PITTSBURG
CINCINNATI	

*Correspondence on Marine Engineering, Ship
Building and Shipping Subjects Solicited.*

Subscription, \$3.00 per annum. To Foreign
Countries, \$4.50.

Subscribers can have addresses changed at will.

Change of advertising copy must reach this office
on Thursday preceding date of publication.

The Cleveland News Co. will supply the trade
with the MARINE REVIEW through the regu-
lar channels of the American News Co.

European Agents, The International News Com-
pany, Brema Building, Chancery Lane,
London, E. C. England.

Entered at the Post Office at Cleveland, Ohio, as
Second Class Matter.

SEPTEMBER 20, 1906.

FREE FOR ALL CONTEST.

The MARINE REVIEW is requested by the officers of the Merchant Marine League of the United States to state that every essay received in its prize contest will receive fair and just treatment. Some newspapers, unquestionably hostile to American shipping development, are seeking to create the impression that the league will not deal fairly with essays that favor the free trade, free ship or some other anti-protection, anti-government aid, policy. Nothing can be said that is more unjust or unfair.

It is the purpose of the league officers to deal with all essays strictly upon their merits, and merit alone will be the basis of the award. Where contestants ask for information, the league refers them to the Tariff Reform Committee of the Reform Club,

of New York, a free trade organization that for years has been carrying on an active propaganda against all measures seeking to build up our shipping with the aid of the government. In addition, contestants are informed that speeches were made in the last congress against the shipping bill, which passed the senate on Feb. 14, by Senator S. R. Mallory, of Pensacola, Florida, and by Representatives William Sulzer and Joseph A. Goulden, of New York, and by Representative George G. Gilbert, of Shelbyville, Kentucky.

The league goes still further and advises contestants who ask for information to ask their representatives in congress to procure for them copies of the report of the U. S. Commissioner of Navigation, and the bibliography issued by the librarian of congress, which latter catalogs everything extant on the shipping question, whether for or against government aid. With this information in his possession, and with the reports of the Congressional Merchant Marine Commission, the reports of the Senate Commerce Committee and the House Merchant Marine and Fisheries Committee, the speeches made by Senators Frey, Gallinger and Lodge, and the speech by Representative Grosvenor, in favor of that bill which passed the senate in February, and which reports and speeches cover the question from the protectionist view very thoroughly, no student, ambitious of winning fame, honor and a substantial sum of money, need hesitate to become a contestant for one of the prizes.

HOW GOMPERS HELPED.

When President Samuel Gompers, of the American Federation of Labor, invaded the second Maine congressional district, for the purpose of defeating Representative Charles E. Littlefield for re-election, he opposed the latter on three counts, viz: 1. The anti-injunction bill. 2. The Merchant Marine Commission's shipping bill. 3. The anti-compulsory pilotage bill. A large number of Mr. Littlefield's constituents, democrats and republicans

alike, as vessel owners and as vessel builders, are deeply interested in, and will be vastly benefited by, the enactment of those two bills. So, the more President Gompers showed up Congressman Littlefield as making a strenuous fight for the shipping bill and the anti-compulsory pilotage bill, the more he helped to elect the man he was seeking to defeat. Mr. Littlefield won triumphantly, and Mr. Gompers, and his score of aides, retired from the contest very much ruffled.

It is true that Mr. Littlefield won by a greatly reduced majority, as compared with the majority he received two years ago. But, as compared with the other Maine republican candidates for re-election to congress, the reduction in the majority in Mr. Littlefield's district was not so large as in some of theirs. Moreover, he ran ahead of his ticket, especially in the cities where President Gompers and his aides had been most active.

There is probably no district in the United States where a larger number of voters are so directly interested in favorable shipping legislation as in the second Maine. That many democrats were able to, and did, show their contempt for President Gompers, and his charges against Representative Littlefield, by voting for the latter, is an evidence both of their good sense and their patriotism. Mr. Littlefield will resume his activity, at the coming short session of congress, in behalf of the shipping bill and the anti-compulsory pilotage bill, with renewed zest, and all signs indicate that he will succeed, to the discomfiture of Mr. Gompers and those secret enemies of American shipping who are backing him in his fight against those who favor those bills.

QUESTIONS FOR MASTERS AND MATES.—NO. 10.

146. What is meant by the portative force of a magnet?

147. Two magnets of equal size, such as two adjusting magnets, how could you put them together so as to destroy or neutralize their magnetism?

148. What is an isogonic line?

149. What is the difference between an isogonic line and a line of equal variation?

150. What is an agonic line?

151. Is there an agonic line passing through the lake region?

152. How does a compass point on this agonic line?

153. Does a magnet lose any of its force by being incased in brass or copper, such as adjusting magnets?

154. What effect has a brass or copper casing as to the portative force of a magnet?

155. What is meant by attraction across bodies?

156. Will attraction assert itself through wood, brass, glass, etc.?

157. Is it possible to intercept magnetism by placing wood, brass and like substances, between the compass and the iron or steel creating the disturbing force?

158. Does a magnet covered with wood have the same amount of magnetic force it would were it not covered with wood?

159. What are magnetic charts?

QUESTIONS FOR WHEELSMEN AND WATCHMEN.—NO. 11.

Questions 94 and 97 in the wheelmen's and watchmen's contest are republished in somewhat different form for the purpose of added clearness. Question 94 should read as follows:

94. What good mark is there to bring stern of boat on from Sandwich Point to abreast Woodward avenue, Detroit?

Question 97 should read as follows:

97. When bound up Detroit river steering on Windmill Point ranges, what turning mark have you when hauling for entrance to Grosse Point cut? What would you head your vessel on, and what landmark would you have the stern of boat on?

112. What ranges should you run on going from Southeast bend to Star Island House?

113. After leaving lower end of Grosse Pt. channel what marks would you head on and what mark would you have the stern of boat on?

114. What mark would you have to make a slow turn to have stern of boat on Windmill Point ranges?

115. When desiring to round to bound down at Detroit at night and can't see spar buoy at lower end of Belle Isle, what marks have you to know when you are abreast of it?

116. As it is often smoky passing down from Belle Isle to Sandwich Pt., tell us if you have any mark to head on and what it is?

117. When abreast Smith's coal dock what ranges would you use and which way would you keep them open?

118. Name in proper order what ranges you head on and what ranges you put stern of steamer on from Smith's coal dock to lower end of Bois Blanc Island.

119. When wanting to know when to starboard slowly so as to bring stern of steamer on South Grosse Isle channel ranges, tell if you have any mark and what it is.

120. Which way will the current carry you from South Grosse Isle channel ranges to upper end of Ballard's reef channel?

121. If bound down what whistle side would you take of steamer bound up?

QUESTIONS FOR OILERS AND WATERTENDERS.—NO. 7.

61. What temperature should you carry the feed water in a jet condenser?

62. Why is not a greater vacuum than 25 or 26 inches carried?

63. If you found your discharge pipe from air pump vibrating, or your pump thumping, what would you do?

64. How would you find the length of the eccentric rod with link motion?

65. Give the thickness of the various plates used in boiler manufacturing shell plates being one (1) inch thick.

66. If you had (2) two boilers of the same diameter, what would their relative pressures depend upon?

67. If one boiler was 12 ft. in diameter and the other 4 ft., which would stand the greatest pressure, and how much?

68. If the glass water gauge is fitted on a mounting connected by two pipes, one to the dome and one to water space, what would you do on observing (1st) that the glass was empty, and (2d) that the glass was full?

69. What is one of the most important duties of an engineer or oiler O. B. ship?

70. In assisting to set a valve you had $\frac{1}{8}$ in. top lead and $\frac{5}{8}$ in. on the bottom, you wanted 5-16 in. on top and 9-16 in. on the bottom, what would you do?

FROM GRATIOT LIGHT TO SARNIA ELEVATOR.

A leading vessel owner has issued the following instructions to the masters of his fleet:

"In coming down from Fort Gratiot light until after you pass the elevator at Sarnia, we would advise that you proceed at about half speed until after passing the elevator. In our opinion this will give you a better chance to have your ship under control in case of an accident in the crowded channel."

The masters of this fleet have cordially indorsed the suggestion. This is a dangerous stretch of water to

navigate at full speed, and it has been suggested that half-speed should be a government regulation.

LAUNCHING THE W. E. FITZGERALD.

The steamer Wm. E. Fitzgerald, building for the Chicago Navigation Co., of which Capt. Dennis Sullivan is manager, was launched from the Wyandotte yard of the American Ship Building Co. on Saturday last. The Fitzgerald is one of the smallest vessels now building on the lakes, being 440 ft. over all, 420 ft. keel, 52 ft. beam and 28 ft. deep. Her engines are triple-expansion, with cylinders 22, 35 and 58 in. diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 13 ft. two inches by 12 ft., fitted with Ellis & Eaves draft and allowed 170 lbs. pressure. This steamer was named in honor of Mr. W. E. Fitzgerald, whose accidental death a couple of years ago was deplored along the whole chain of lakes. At the conclusion of the launch luncheon was served on board the steamer Pleasure. President Wm. Livingstone, of the Lake Carriers' Association, presided as toastmaster and informal remarks were made by a number of speakers. Those present were. From Chicago—Capt. D. Sullivan, Mrs. Sullivan, Miss Helen Sullivan, Paul Sullivan, Mr. and Mrs. George L. McCurdy, Miss Helen McCurdy, R. J. Dunham, Mr. Adams. From Milwaukee—Mrs. W. E. Fitzgerald, W. L. Fitzgerald, Master Edmund Fitzgerald, Mr. and Mrs. Frank W. Smith, Mr. and Mrs. Charles Neff, Mr. and Mrs. Blackburn, Gordon Blackburn, Miss Lucy Dore, Thomas Sheriffs, Capt. John Joys, A. M. Joys. From Cleveland—Mr. and Mrs. James C. Wallace, Robert Logan, Mr. and Mrs. Irving Latimer, W. G. Beck, Frank Masten, John R. Scott and Frank LaMarche. From Buffalo—Capt. J. J. H. Brown. From Detroit—Mr. and Mrs. M. E. Farr and daughter, William Livingstone, W. A. Livingstone, Rear Admiral Charles Cotton, Mr. and Mrs. A. A. Schantz, Mr. and Mrs. L. C. Waldo and daughter, Capt. J. W. Westcott, Frank Jeffrey, Mr. and Mrs. H. T. Morley, A. C. Angell, Mr. and Mrs. R. T. Gray, H. K. Oakes, Mr. and Mrs. E. L. Thompson, N. D. Carpenter, Joseph King, Dr. J. E. King, Capt. T. LeMay, Capt. George Bryce and others.

Capt. Alex Callam, of Amherstburg, will command the Fitzgerald, and Frank Keating will be her chief engineer.

NEW STEAMER FOR GOOD-RICH LINE.

The Goodrich Transit Co., of Chicago, has given contract to the Manitowoc Dry Dock Co., for the construction of a steel passenger steamer to be named Alabama. The new steamer, which is to be ready on July 1 next, is to be 250 ft. over all, 230 ft. keel, 40 ft. beam and 17 ft. deep. Intended for use during the entire year, the Alabama will be built of the heaviest material with a double thickness of plating at the bow for ice crushing. Around the ship at the water line there will also be an extra plating. The hull will be divided into eight watertight compartments and her engine power will be sufficient to drive her at the rate of sixteen miles an hour.

AROUND THE GREAT LAKES.

Capt. John Mitchell, of Cleveland, who has been abroad for two months, has returned.

W. H. Meyer, president and general manager of the Milwaukee Tug Boat line, died at Denver this week.

The Canadian steamer Rosemount,

which went on the rocks about twelve miles below the Detour lighthouse, has been raised.

The steamer Madagascar, lumber carrier, having been sold by Bigelow Bros., has gone to the coast. Her home port hereafter will be Boston.

A severe wind storm at Escanaba, blew down two giant coal hoisting towers, each weighing 400 tons, on the dock of the Reis Coal Co. last week.

The steamer H. B. Tuttle, with a cargo of coal, sprung a leak off Cedar Point, Lake Erie, last week, and sank half a mile off Marblehead light. The steamer is in no danger.

Land for docks has been purchased by the Wabash railroad on the north side of the Black river at Lorain, five miles from its mouth and a mile above the National Tube Co.'s docks.

Thomas C. Frame and W. C. McCreery, who have been employed by the United States engineers' office at Ashtabula, have left the government employ to work with the Pennsylvania under J. P. Fitzgerald, engineer-in-charge.

The steamer R. A. Seymour was picked up in a disabled condition fifteen miles off Frankfort, Mich., in a

heavy sea last week and taken to Sturgeon bay. The steamer had blown out her cylinder head.

Capt. E. D. Gatfield's promotion from a mate's berth to the command of the steamer William P. Snyder, has brought about the advancement of Otto Framer, who goes from a second to a first mate's berth. Harvey Bonnah will act as second mate. The Snyder made her first trip to Ashtabula this week, carrying 10,050 tons of ore to the Union dock.

The steamboat inspection service has issued a circular directing attention to the act regulating motor boats of fifteen gross tons or less which carry passengers for hire. The purpose of this act is to require the operators of these boats to take out licenses through the board of local inspectors, though no examination is required to obtain the license. The new regulations require that every person so licensed shall be over twenty-one years of age. A fine of \$500 is imposed for navigation of one of these craft without having such a licensed person in charge.

BROWNHOIST



LOCOMOTIVE CRANES

Equipped with or without Brownhoist Grab Buckets, are efficient and economical Tools about Docks, Yards and Wharves.



THE BROWN HOISTING MACHINERY CO.

Engineers, Designers and Manufacturers of Hoisting Machinery and its Equipment.

CLEVELAND, OHIO

NEW YORK

LONDON

PITTSBURG

ASHTABULA EDITION

THE NEW YORK
PUBLIC LIBRARY

THE MARINE REVIEW

VOL. XXXIV.

CLEVELAND, SEPTEMBER 20, 1906.

No. 12.

Great Lakes Dredge & Dock Company

RIVER AND HARBOR IMPROVEMENTS

Foundations, Bridges, Piers, Breakwaters,
Lighthouses, Tunnels, Pneumatic
and Submarine Work.

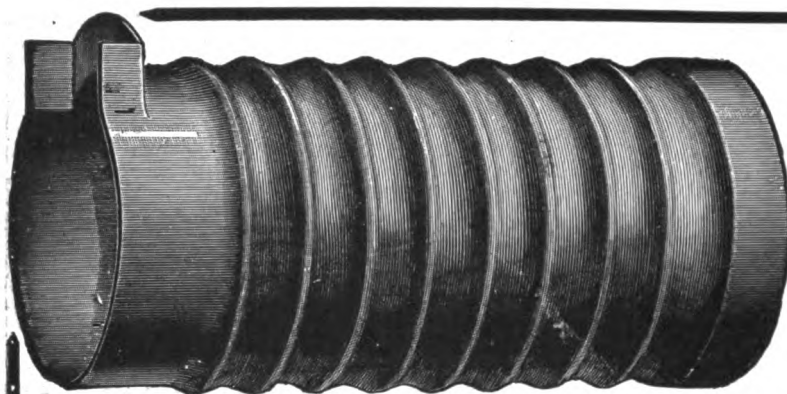
CHICAGO

DULUTH

CLEVELAND

TOLEDO

SAULT STE. MARIE



Morison Suspension Boiler Furnaces

For Land and Marine Boilers

Uniform Thickness—Easily Cleaned
UNEXCELLED FOR STRENGTH

Also Fox Corrugated Furnaces

Manufactured
by

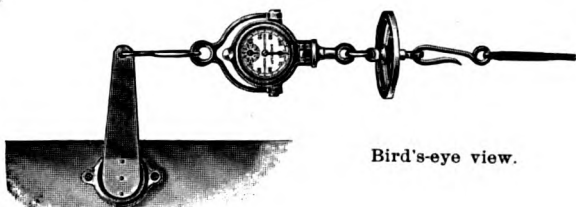
THE CONTINENTAL IRON WORKS,

West and Cayler Sts., NEW YORK.
Near 10th and 23d Sts. Ferries
Borough of Brooklyn.

WALKER'S PATENT "Excelsior" Log

for use on

MOTOR-BOATS AND YACHTS



Bird's-eye view.

WELL MADE---COMPACT---RELIABLE

The "NAPIER MAJOR" motor-boat in her non-stop trip "London to the Shetlands" used one of these logs. The log worked excellently.

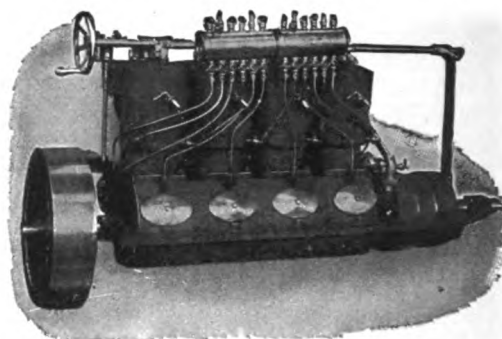
MANUFACTURED BY

Thos. Walker & Son, Ltd.

58 OXFORD STREET,
BIRMINGHAM, ENGLAND.

TRUSCOTT

THE DEPENDABLE MARINE MOTOR



Made to withstand the most severe and continuous service. A practical design characterized by the accessibility, compactness and simple ignition, gas producing and oiling features. Perfect control.

Four cycle type two and four cylinders, from 8 to 65 H.P. Smaller sizes of the two cycle type.

Catalogue and copy of The Launch for the asking.

Department 46.

Truscott Boat Mfg. Co.

ST. JOSEPH, MICHIGAN.

SHIP MACHINERY, embodying the latest designs and many important patented improvements.

Sole builders of the Original and Only
**AUTOMATIC
STEAM TOWING MACHINE.**

Established:
1857

**AMERICAN
SHIP WINDLASS CO.**
Providence, R. I.

P. O. Box 53

We have completed our new Iron Foundry, and are prepared to execute orders for Castings, guaranteeing first-class work, prompt service and reasonable prices.

Send for illustrated
catalogue

Address FRANK S. MANTON, President

DEARBORN DRUG & CHEMICAL WORKS

WM. H. EDGAR, Founder

DEARBORN FEED-WATER TREATMENT

Made to suit the water as per analysis, used regularly, keeps boilers free from scale and prevents any corrosive action the boiler water may have on the iron.

Economy of operation is possible only with clean boilers.

20 Branch Offices in the U. S.

226-234 Postal Telegraph Bldg.,
CHICAGO

299 Broadway,
NEW YORK

Smith's Coal Dock

DETROIT RIVER
DETROIT, MICH.

12 Pockets. Platform.
Low Dock.

Operated by

STANLEY B. SMITH & CO.

G

Wrecking Steamer FAVORITE

Located at St. Ignace this Year.

The Wrecking Steamer FAVORITE, Alex. Cuning, Master, will be stationed during season 1906 at ST. IGNACE, MICH. A Long-Distance Telephone has been installed on board the steamer. When at her home dock, the steamer can be reached by telephone any time day or night, 'Phone Number 63, and in absence of steamer full information as to the steamer may be obtained by telephoning to residence of Capt. Cuning, St. Ignace.

The Favorite and her equipment were thoroughly overhauled during the past winter, and are in first class condition to do outside work.

PITTSBURG COAL COMPANY

GENERAL OFFICE, LAKE DEPARTMENT, ROCKEFELLER BUILDING, CLEVELAND, OHIO

Steamboat Fueling Facilities at Various Points on the Great Lakes

CLEVELAND HARBOR { 4 Car Dumpers.
3 Lighters.

FAIRPORT HARBOR { 1 Car Dumper.
1 Lighter.

ERIE HARBOR { 1 Car Dumper.
Fuel Lighter.

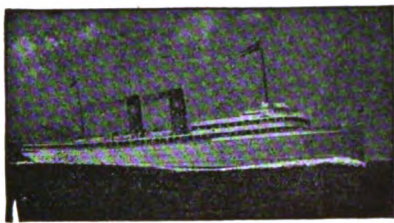
ASHTABULA HARBOR { 1 Car Dumper.
1 Lighter.

DETROIT RIVER BRANCH { Docks and Pockets at
Sandwich and Amherstburg.

SAULT RIVER BRANCHES { Dock—Pittsburgh Landing.
Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

WE FURNISH ONLY THE BEST GRADE OF

PITTSBURG AND YOUGHIOGHENY COAL



The American Ship Building Company

MAIN OFFICE CLEVELAND, OHIO

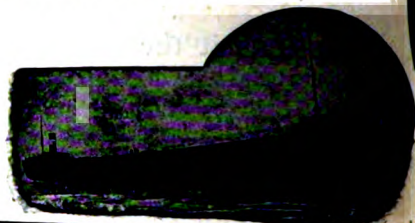
Marine and
(Stationary Engines

STEEL SHIPS

Boilers and
Auxiliary Machinery

Sole Agents for the Lakes for the Ellis & Eaves Induced Draft System,
as applied to boilers, giving increased power and great economy.

WORKS AT CLEVELAND AND LORAIN.



Detroit Ship Building Company

SHIP AND ENGINE BUILDERS

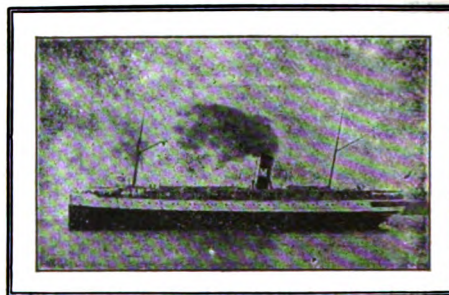
Sole Owners for the Lakes and Atlantic Coast
of the HOWDEN HOT DRAFT SYSTEM as
applied to Boilers, giving increased power and
great economy.

Steel Ship Yard located at Wyandotte, Michigan
Wooden Ship Yards and Dry Docks, Foot of Or-
leans Street, and Foot of Clark Ave., Detroit, Mich.

Wm. C. McMillan, President.
M. E. Farr, V. P. and Treas.
E. Ketcham, Secretary.
Frank Jeffrey, General Supt.

WM. L. BROWN, Pres.
J. O. WALLACE, Vice-Pres.
R. C. WETMORE, Sec'y and Treas.
C. W. FREY, Ass't. Treas.
ALFRED G. SMITH, Gen'l Supt.

Chicago Ship Building Company



STEEL SHIPS

Passenger or Freight

ANY SIZE

Yards, Dry Docks and Repair
Shops at South Chicago, Ill.



The Superior Ship Building Company

SHIP AND ENGINE BUILDERS

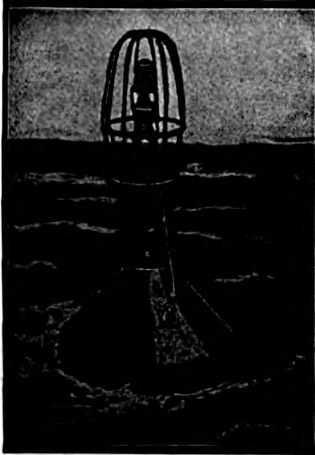
Dry Docks and Repairs of all kinds

Large stock of material always
on hand for Repairing Wooden
and Metal Ships.

Repairing promptly attended
to, Night or Day.

WEST SUPERIOR

WISCONSIN



Pintsch Gas Lighted Buoys

BURN CONTINUOUSLY

FROM 80 TO 365 DAYS AND NIGHTS WITHOUT ATTENTION AND CAN BE SEEN AT A DISTANCE OF SIX MILES.

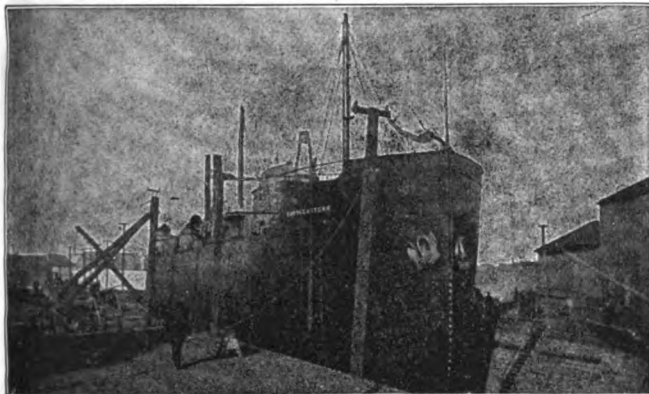
Brilliant & Steady Illumination. Economical & Reliable in Operation.

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1900 gas buoys and gas beacons in service.

Controlled by the

SAFETY CAR HEATING & LIGHTING COMPANY

160 Broadway, NEW YORK CITY.



Milwaukee Dry Dock Company

MILWAUKEE

WISCONSIN

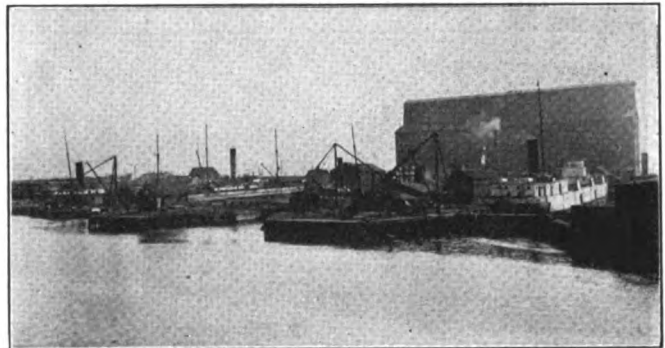
**SHIP REPAIRS
OF ALL KINDS**

We have two ship yards offering every facility for the repair of both steel and wooden vessels. South Yard Dock is 450 ft. long on keel blocks; 460 ft. over all; 60 ft. width of gate and 16 ft. over sill. West Yard Dock is 312 ft. on keel blocks; 45 ft. width of gate and 12 ft. over sill. Rudder pit in each dock.

Electric lights for night work.

MAIN OFFICE AT SOUTH YARD
Foot of Washington Street

Telephone Main 3



Announcement

Our plant having been thoroughly reorganized both as to management and equipment, we are enabled to do all kinds of ship repairs at reasonable cost to the owners, whose patronage is solicited with the guarantee of satisfaction in all particulars.

We call attention to our facilities for the construction of new vessels of all kinds, particularly dredging outfits, tugs, scows, fuel lighters, etc., plans for which we will furnish on application together with specifications and estimates of cost.

The Buffalo Dry Dock Company

BUFFALO, NEW YORK

EDWARD SMITH, President EDWARD N. SMITH, Superintendent
WILLIAM KNIGHT, Ass't. Sec'y and Treas.

Office Telephone, 515 Seneca. President's Office Telephone, 2329 Seneca
President's Residence Telephone, 209 Bryant. Ass't Sec'y's Telephone, 324 North.
Superintendent's Telephone, Bryant 209.

THE TOLEDO SHIPBUILDING COMPANY

BUILDERS AND REPAIRERS OF

SHIPS AND ENGINES

FRANK E. KIRBY, CONSULTING ENGINEER.

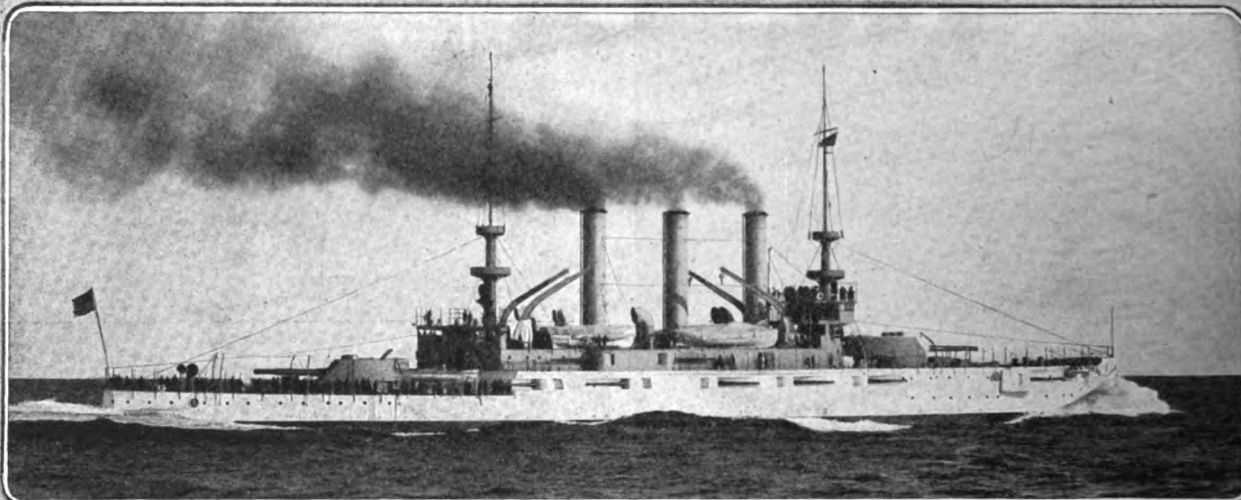
TOLEDO, OHIO

ALEXANDER MCVITTIE, PRESIDENT.
CHAS. B. CALDER, GENERAL MANAGER.

H. S. WILKINSON, SECRETARY.
L. C. SMITH, TREASURER.

OUR SHIPYARD

WITH ITS ACCOMPANYING DRY DOCKS
AND WORKS, WAS CAREFULLY DESIGNED,
EQUIPPED AND COMPLETED FOR THE



CONSTRUCTION AND REPAIRING
IN EVERY DETAIL OF

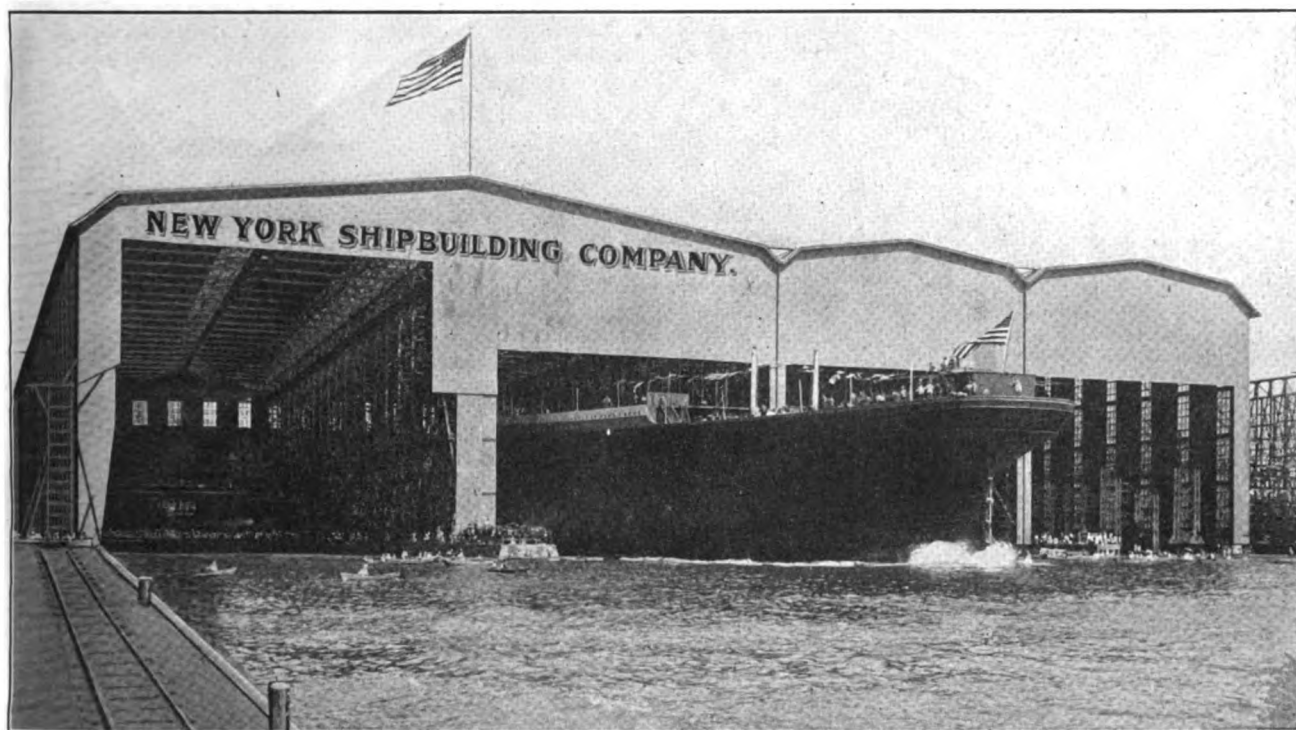
BATTLE SHIPS · ARMORED CRUISERS ·
PROTECTED CRUISERS · GUN BOATS ·
TORPEDO BOATS · TORPEDO BOAT
DESTROYERS · SUBMARINE BOATS ·
OCEAN LINERS · PASSENGER STEAM-
ERS · FREIGHT CARRIERS · ETC · ETC ·

NEWPORT NEWS SHIPBUILDING & DRY DOCK CO.
1 BROADWAY NEW YORK — NEWPORT NEWS, VA.

New York Shipbuilding Company

Main Office and Works, Camden, N. J.

New York Office, 12 Broadway



Launch of "Mongolla," Pacific Mail S. S. Co., 615 feet long, 65 feet beam, 51 feet deep.

Builders of

**SHIPS, ENGINES, BOILERS
AND HEAVY MACHINERY**

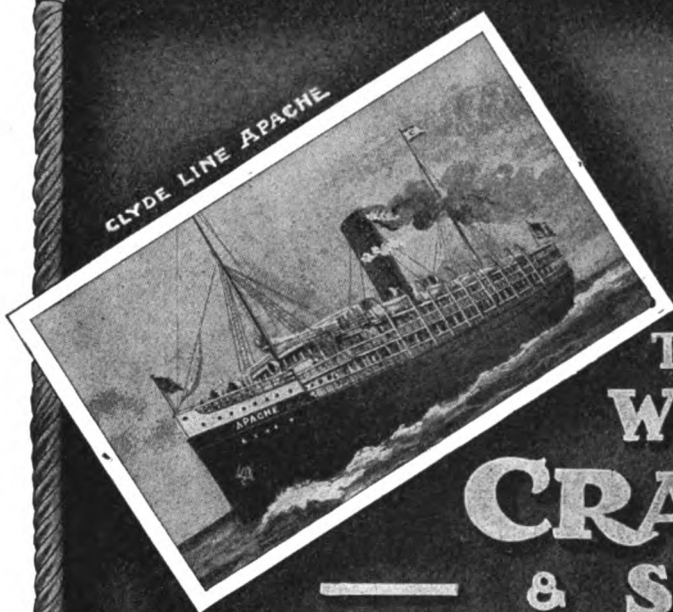
Best Facilities for Repair Work

Pneumatic and Electric Tools; ample wharfage accommodation.

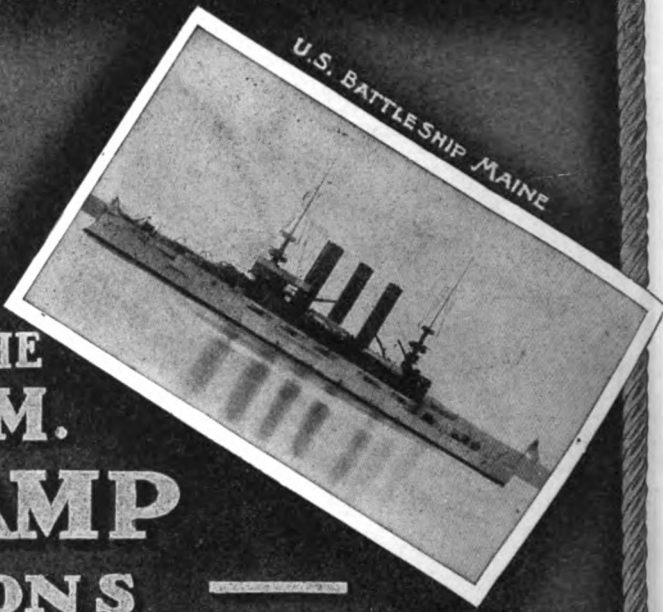
**One Hundred Ton
Crane**

**Repairs done under
Shelter**

CLYDE LINE APACHE



U.S. BATTLESHIP MAINE



THE
WM.
CRAMP
— & SONS —
SHIP & ENGINE BUILDING Co.
ESTABLISHED 1830

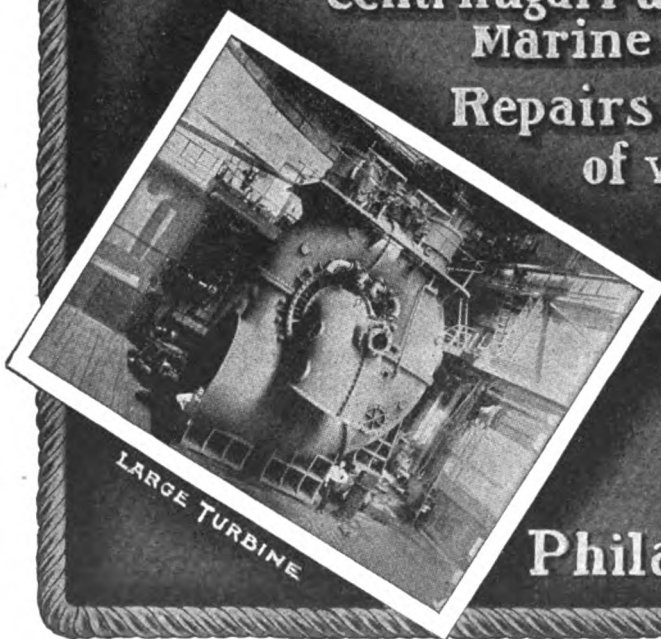
I.P. MORRIS COMPANY
(ESTABLISHED 1829)

KENSINGTON SHIPYARD Co

WARSHIPS AND MERCHANT STEAMERS
Pumping, Blowing and Hoisting Engines, Dry Docks
Vertical and Horizontal Turbines
Centrifugal Pumping Machinery
Marine Railway.

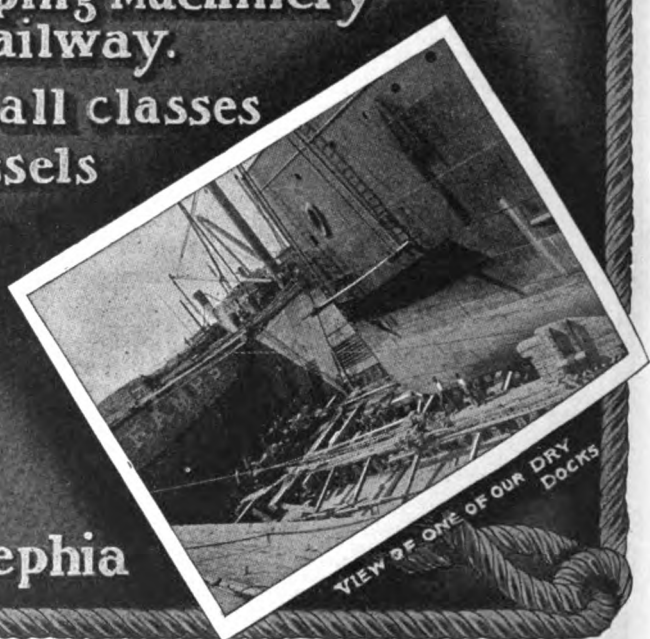
Repairs to all classes
of vessels

LARGE TURBINE

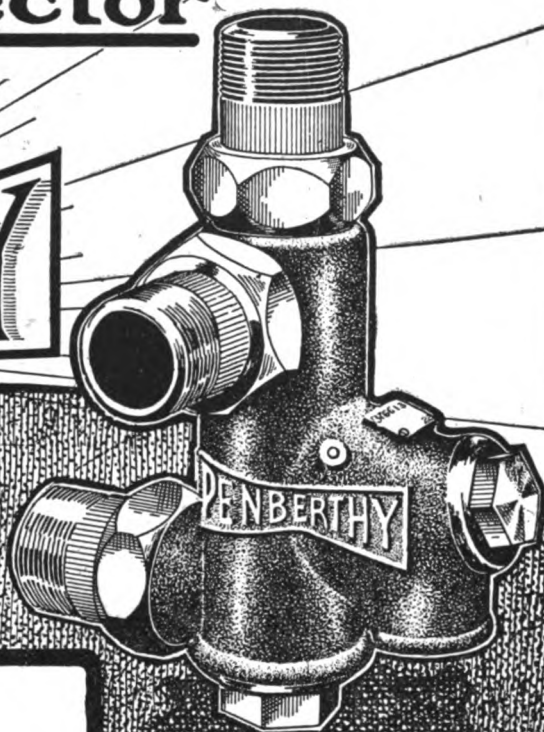


Philadelphia

VIEW OF ONE OF OUR DRY DOCKS



The Sun Never Sets on the Penberthy Injector



Send for Catalog of
INJECTORS, OILERS, ETC.
PENBERTHY INJECTOR CO.
 Branch: N. Y. City. Detroit, Mich.

U.S. Automatic Injector



In the
 mind of
 "Uncle Sam"

the U. S. Automatic is the World's best injector. It is officially endorsed by the U. S. Government because of superior merit.

The U. S. Automatic feeds hotter water than any other injector and works equally well as a lifting or non-lifting injector. Never freezes, easily cleaned and always reliable. Saves fuel, water and worry—100% efficiency.

Each one is tested before leaving factory and actual results shown on the Certificate of Range and Capacity attached to it. Business prudence demands that you buy the U. S. Automatic injector.

Free. Let us send you a copy of our famous "Engineer's Red Book"—free on request.

American Injector Co.
 DETROIT, U. S. A.

LUNKENHEIMER REGRINDING VALVES

The Embodiment of Perfection



Self contained. No extra parts required to repair them when worn. A few minutes spent in regrinding and they are as good as new.

If your local dealer cannot furnish them, notify us.

The Lunkenheimer Co.

LARGEST MANUFACTURERS OF HIGH-GRADE
 ENGINEERING SPECIALTIES IN THE WORLD.

General Offices and Works: Cincinnati, Ohio, U. S. A.

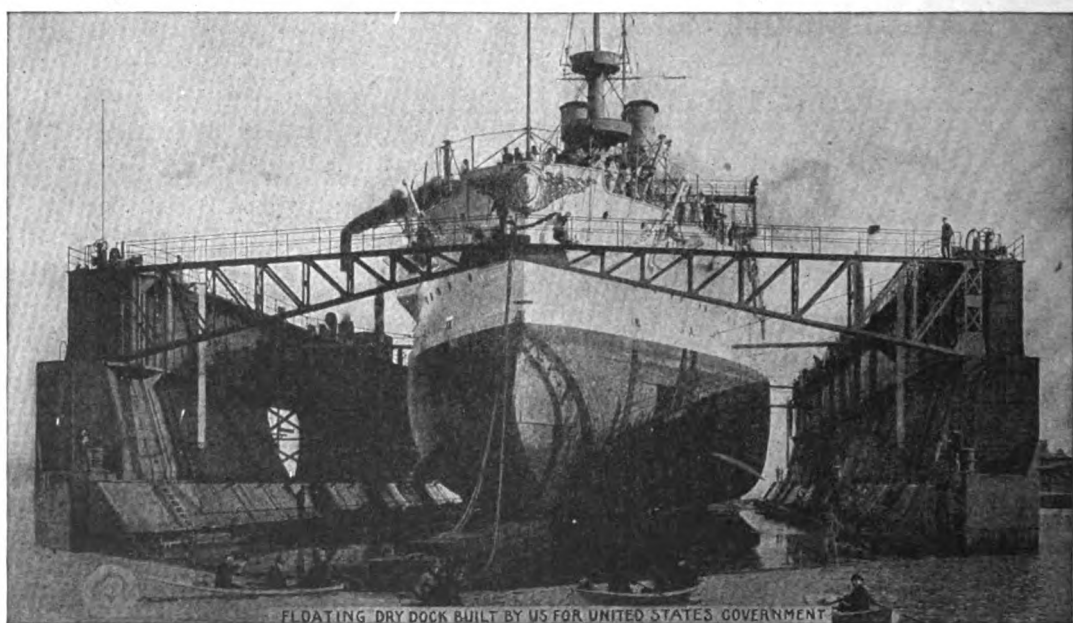
Branches: NEW YORK, 66-68 FULTON ST.
 LONDON, S. E., 35 GREAT DOVER ST.

I. M. R.

MARYLAND STEEL COMPANY

BUILDERS OF STEEL STEAMSHIPS,
TOW BOATS, SAILING VESSELS,
BARGES AND STEAM CRAFT
OF EVERY DESCRIPTION

STEEL FLOATING DRY DOCKS
CAPABLE OF DOCKING
THE LARGEST VESSELS



FLOATING DRY DOCK BUILT BY US FOR UNITED STATES GOVERNMENT

SPARROW'S POINT,
MARYLAND.



National Metallic Packing

PATENTED IN U. S. AND FOREIGN COUNTRIES.

This packing is giving perfect satisfaction on all styles of rods on marine and stationary engines, locomotives and air compressors, and works perfectly on all sizes of rods from the highest to the lowest pressure. A glance at the above cut will show that the packing is arranged so that it adjusts itself to the rod and gives the rod a high polish and reduces the friction to a minimum.

The National Metallic Packing Co.,
OBERLIN, O.

EUGENE PASSANO, Gen. Marine Agent, Western Reserve Bldg., Cleveland, O.
THOMAS B. BANNER, Marine Agent, 57 E. Kinzie St., Chicago, Ill.
DOWNEY & KRUSE, Marine Agents, Milwaukee, Wis.



You can take the Machine to the work,

and save almost any amount of labor over cutting and threading pipe by hand with a cutter and stock.

Armstrong's Pipe Cutting and Threading Machines are light, strong, compact and portable up to 4'.

This means dollars in your pocket, and you ought to investigate. Interesting and complete catalogue free.

THE ARMSTRONG MFG. CO.
314 Knowlton St., Bridgeport, Conn.



FERRALL'S HUB HOISTER AND Sheave for Same.

The sheaves of these hoisters are fitted with Star Metaline Bushings and Side Bearings, which keep the sheaves from heating, make them run true and together with the rounded edges of the shells, soon save more than their cost, by preserving the rope.

BOSTON & LOCKPORT BLOCK CO.
BOSTON - MASS.

THE ROBERTS SAFETY WATER-TUBE BOILER CO.

Manufacturers of
High Grade

Marine Water Tube Boilers

Generators of the Highest Quality of Steam
NEARLY 1500 IN USE

Send for circulars
and stock sheet

MAIN OFFICE

39 Cortlandt St. New York City

Phone 599 Cortlandt

Works: Red Bank, N. J.
Phone, 49 Red Bank

Cable Address
"Bruniva"

OTIS STEEL

SHIP PLATES FLANGE PLATES TANK PLATES STEEL CAR AXLES FORGINGS OF ALL KINDS
"Otis" Fire Box Plates a Specialty.

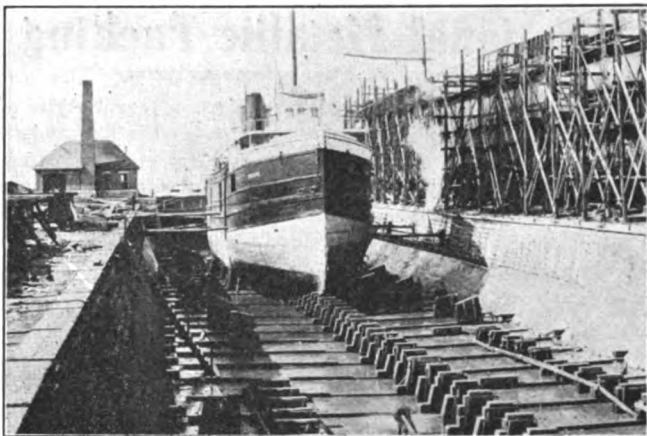
STEEL CASTINGS FROM 100 TO 100,000 LBS.

OTIS STEEL CO., Ltd., Head Office and Works, CLEVELAND, O.

New York: Thorpe, Platt & Co., 97 Cedar St.
Montreal: Homer Taylor, 183 St. James St.

AGENCIES.

St. Louis: C. A. Thompson, 516 N. Third St.
San Francisco: John Woodlock, 184-186 First St.
Detroit: George W. House, Union Trust Building.



Collingwood Shipbuilding Co.

COLLINGWOOD, ONTARIO.

STEEL & WOOD SHIPS

Marine and Stationary Engines
Boilers and Auxiliary Machines

Dry Dock 514 ft. Keel Blocks

ALEX. McDOUGALL
PRESIDENT

J. M. SMITH
MANAGER

GREAT LAKES REGISTER

FOR THE
CLASSIFICATION OF STEEL AND WOODEN VESSELS.



COMBINED AND ISSUED IN CONNECTION WITH
BUREAU VERITAS
INTERNATIONAL REGISTER OF SHIPPING.

THE RATINGS OF GREAT LAKES REGISTER GO BEFORE AND ARE ACCEPTED BY THE LEADING UNDERWRITERS OF AMERICA AND EUROPE. VESSELS BUILT UNDER THE SUPERVISION OF ITS SURVEYORS WILL RECEIVE SPECIAL RATING, AND WILL ALSO BE PUBLISHED IN BUREAU VERITAS INTERNATIONAL REGISTER OF SHIPPING.

PLANS AND SPECIFICATIONS FURNISHED.

GREAT LAKES REGISTER SURVEYORS ARE ESTABLISHED AT ALL THE PRINCIPAL PORTS ON THE GREAT LAKES.

F. D. HERRIMAN, SURVEYOR GENERAL,
820-822 Perry-Payne Building, CLEVELAND, O.

CHAS. E. & W. F. PECK,

Insurance Brokers. Average Adjusters.

ESTABLISHED 1870.

NEW YORK, 58 William Street,
BOSTON, 153 Milk St.

BUFFALO, 914 The Fidelity Bldg.

CLEVELAND, 1006-1008 Rockefeller Bldg.

CHICAGO, 1114-15 Royal Insurance Bldg.

REPRESENTED BY

C. T. BOWRING & CO., (Insurance) LTD.,
5 and 6 Billiter Ave., LONDON,
and at "LLOYD'S" LONDON.

HULLS and CARGOES.

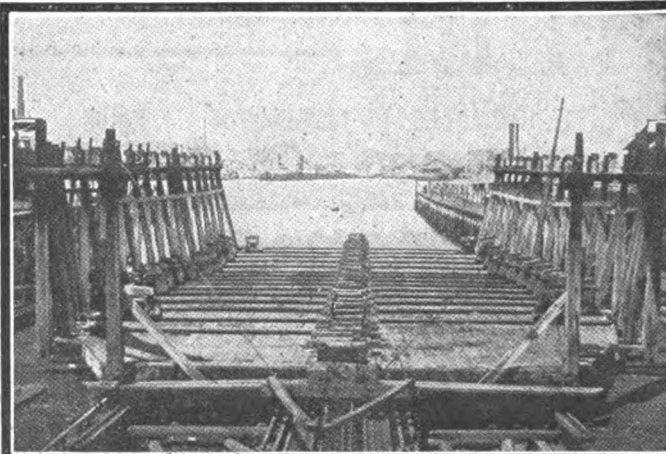
We place insurances in the most advantageous markets, employing, in the interest of our clients and with equal facility, all Foreign and Home companies, at the best procurable rates and terms.

We Represent Only the Assured.

Alphabetical Index of Advertisers

on page 49 this issue.

The Blue Book of American Shipping,
Marine Directory of the World, \$5.00



The Dry Dock of the 20th Century.

RAILWAY DRY DOCKS

TIMBER OR STEEL CONSTRUCTION

Safe—Convenient—Rapid.

H. I. Crandall & Son Co.

Engineers and Contractors

East Boston, Mass., U. S. A.



8' x 12' FLOAT—45 PERSONS—450 CUBIC BOAT FEET

WE CAN SAVE YOU**75% deck space 50% weight 90% cost of maintenance****THE CARLEY LIFE FLOAT**

Constructed of Copper, Cork, Canvas and Cordage.
Requires no davits or tackle.

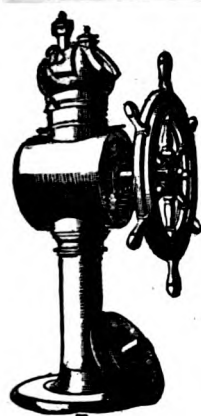
Standard sizes range from six to sixty-seven persons capacity.

LIFE BOATS**LIFE PRESERVERS***Send for Illustrated Catalogue.***CARLEY LIFE FLOAT COMPANY****F 4 & 5 Produce Exchange Building, New York.****Ritchie
Liquid
Compass**

The Standard Liquid
Compass used exclusively
by the U. S. Navy for
over 35 years. Over
32,000 used in Merchant
Service.

Made in all sizes and styles, from 2 to 12 inches diameter of card. All compasses made by us have our name printed below the North point or prominently upon the card. **None other are genuine.** Latest form with four or six needles, the best instrument for iron ships. For sale by ship chandlers and nautical instrument dealers. Catalogue free.

E. S. RITCHIE & SONS, Brookline, Mass., U. S. A.
MANUFACTURERS OF NAUTICAL AND PHYSICAL APPARATUS.

**MARINE MFG. & SUPPLY CO.****157 and 158 South St., New York.****SHIP FITTINGS AND SUPPLIES**

CAPSTANS, WINDLASSES,
STEERING APPARATUS, ENGINE
ROOM TELEGRAPHS, BRASS
AIR PORTS, DEAD LIGHTS,
PUMPS, ETC.

Catalogue A—Air Ports, Ventilators, etc.
Catalogue B—Windlasses, Pumps, etc.
Catalogue C—Steering Apparatus.
Others in course of preparation.

**“RAINO”
For Hard Service**

“Raino” is a guaranteed absolutely waterproof cloth.

For ships' officers, yachtsmen, seamen, etc., it is the ideal waterproof garment.

“Raino” is very light, clean and neat looking. Far superior to either oilskins or rubber. It will not rot, nor is it stiff, heavy, oily or foul smelling.

After two years of the hardest kind of army and naval service tests in all parts of the world hundreds of officers declare it the most durable waterproof garment made.

“Raino” officer's Long Coat... \$6.00
“Raino” Medium Coat..... 5.00
“Raino” Jacket..... 4.50
“Raino” Overalls..... 2.25
“Raino” Soft Squam Hat..... 1.00

Write for Samples and Price List P.

E. A. ARMSTRONG MFG. CO.
(Makers of the famous Armstrong Uniforms.)

*Write for prices on Uniforms.***315-321 Wabash Ave., Chicago.****ARMSTRONG GUARANTEE.**

A week's trial. Rain, Hose or Shower. If not satisfactory express back at our expense. Money returned. Show our faith.



GREAT LAKES ENGINEERING WORKS

DETROIT, MICHIGAN.

GEORGE H. RUSSEL,
Vice President.

ANTONIO C. PESSANO, President and Gen. Mgr.

JOHN R. RUSSEL,
Secretary and Treasurer.

Designers and Builders of
Steel Freight and Passenger Ships.

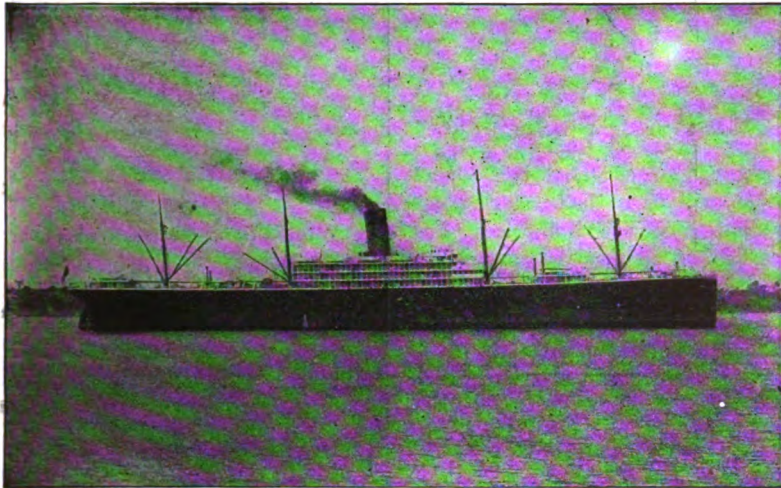


STEAMER "WILLIAM P. SNYDER,"

550 Feet Long, 56 Feet Beam.

Designed and built by us and equipped with patented hawse pipes which permits the anchors being stowed very snugly, bringing them practically flush with outside of the hull. Expensive and serious damage in case of collision is avoided by use of this improvement.

Hyde Windlasses and Capstans



Steamship Minnesota equipped with Hyde Windlass and Capstans.

Selected for the Minnesota and Dakota of the Great Northern Steamship Co.'s fleet—the largest vessels ever built in the United States. They are also being installed on nearly all of the vessels now building for the Navy Department, Revenue Cutter service, Lighthouse Board and the United States Coast Survey.

Reason—Their Superiority

Send for Illustrated Catalog.

HYDE WINDLASS COMPANY

BATH, MAINE

Geo. L. McCurdy

169 Jackson Boulevard

CHICAGO ILLINOIS

INSURANCE

HULLS and CARGOES

DIRECT REPRESENTATIVE OF LEADING
AMERICAN AND FOREIGN UNDERWRITERS

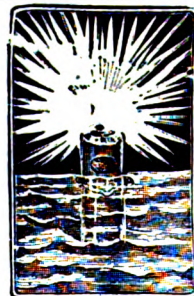
**THE
BOURNE-FULLER CO.**

IRON STEEL

PIG IRON

COKE

Cleveland, Ohio.



The Water Light

**Self-Igniting Inextinguishable
For**

Life Saving	Salvage
Distress Signal	Submarine
Repairs and	General
Construction.	Illumination.

Send for Sample. Agents wanted.

Patentees and Manufacturers

THE MARINE TORCH CO.

BALTIMORE, MD.

Especially approved by The British Board of Trade, either of
Life Buoy Lights or Deck Flare.

WANTED and FOR SALE

PROPOSALS.

SEALED PROPOSALS will be received at the office of the Light-house Board, Washington, D. C., until 2 o'clock P. M., September 29, 1906, and then opened for furnishing the materials and labor of all kinds necessary for the construction and delivery of five steel, steam light-vessels, Nos. 84, 85, 86, 87, and 88, at The Light-House Depot, Tomkinsville, Staten Island, New York; or four of these light-vessels, Nos. 84, 85, 86 and 87, at The Light-House Depot, New York, and No. 88 at The Light-House Depot, Astoria, Oregon, in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to The Light-House Board, Washington, D. C.

FOR SALE.

Steamer T. S. Christle.

Length 160 ft.; beam 30 ft.; carrying capacity, lumber 525,000 ft., coal 800 tons. Rating in Inland Lloyds Register, A1½*, valuation \$22,000. For price and particulars address Capt. P. Larsen, Box 249, Chicago, Ill.

For Sale, Tug Gladiator.

Length, 115 ft.; breadth, 22 ft.; depth, 12 ft. Steeple compound engine 22 x 42 x 30. Housed in forward. Tug can be seen under working conditions at Duluth, Minn., by applying to Split Rock Lumber Co., Duluth, Minn.

Steamer for Sale Cheap.

The lighthouse steamer Haze, 145 ft. long, 27-ft. beam, 9-ft. draught, 500 tons capacity, 300 horsepower engine and boiler, suitable for passenger or freight business, fully equipped. Steam capstan, donkey boiler. Jacob Ullman, 46 Lloyd street, Buffalo, N. Y.

Steamer Hazel.

FOR SALE.—The passenger and freight steamer "Hazel." Length, 93 ft.; beam, 18 ft.; draught about 7 ft. 6 in. For further particulars address R. B. Rice, Grand Haven, Mich.

FOR SALE.

Passenger and package steamer and long established route. Two trips daily between 9 a. m. and 6 p. m. Owner in other business. Exceptional opportunity for investment by Captain or Engineer desirous of engaging in business where he will be at home during entire season. Boat practically new. For full particulars address, *Steamer*, MARINE REVIEW, Cleveland, O.

GASOLINE ENGINE.

FOR SALE.—One ten H. P. gasoline engine, four cycle, for launch. Used only one season, in first class condition.

HUGHES BROS. & BANGS,
726 Hickox Bldg.
Cleveland, O.

For Sale.

1,000 h. p. fore and aft Neafie & Levy compound Engine; surface condenser; independent pumps.
Two 12-foot Scotch Boilers.
One 13½-foot Scotch Boiler.
One 10 16-25 x 16 triple expansion Engine.
Three 150-h. p. Almy Boilers.
One 200-h. p. Tregurtha Boiler.
One 14 30 x 24 fore and aft Engine and condenser.
One Williamson steering Engine.
One 10 k. w. electric lighting Set.
One 15 k. w. electric lighting Set.
One Providence Windlass, 50 fathoms 1½ in. chain.
Two thrust Shafts and Bearings, 8½ in. diameter.

MARVIN BRIGGS,
17 Battery place, New York, N. Y.

Boilers for Sale.

Five Scotch Boilers, allowed 160 lbs, steam. Good as new. ERIE MA CHINERY CO., 729 Garfield Bldg. Cleveland, O.

WANTED

WANTED.—Two first-class Hull Draughtsmen, and two first-class Marine Engine Draughtsmen. Collingwood Shipbuilding Co., Ltd., Collingwood, Ont.

PASSENGER STEAMER.

WANTED.—A small passenger steamer in exchange for tug 77 ft. over all, beam, 18 ft.; draught, 7 ft.; engine, 16 in. by 16 in.; boiler, steam allowed, 110; hull rebuilt 1904. Address C. H. M., MARINE REVIEW, Cleveland, O.

BRIEFS

Read everywhere by men with marine interests. They pull. Tell your wants on this page—say it in an inch or two.

1 Inch, 1 Time, 1 Dollar.

HAVE YOU

noticed how most people closely scan the "for sale" and "wanted" columns of their trade paper? Tell them through the MARINE REVIEW what you want or what you have for sale. They want to know. The cost is a trifle, \$1 the inch. One dollar the minimum.

A Handy Little Chart of the Great Lakes

Mounted on Linen.

10½ X 15 INCHES.

Price Postpaid, 25 cts.

Clearly showing every port on the Great Lakes from Clayton to Duluth. It is small enough to fold up and carry in the coat pocket or pigeon hole of a desk, and is also very suitable for framing.

With this little chart near at hand, you save the trouble of stepping to a chart case and taking out a great big three-foot square chart that is awkward to handle.

The Most Accurate Small Chart Ever Published.

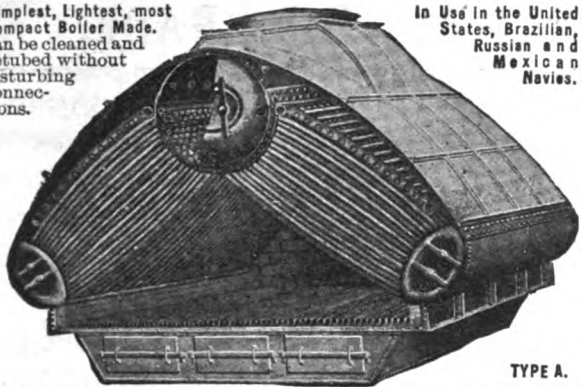
FOR SALE BY

THE MARINE REVIEW, - - CLEVELAND.

THE MOSHER PATENT WATER TUBE BOILER

Simplest, Lightest, most Compact Boiler Made. can be cleaned and retubed without disturbing connections.

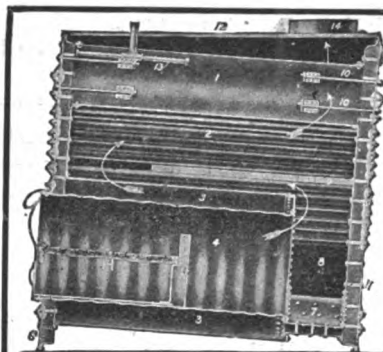
In Use in the United States, Brazilian, Russian and Mexican Navies.



TYPE A.

As many as forty tubes can be cleaned or renewed through a single hand-hole; has greater steam and water capacity than any other water tube boiler. Send for descriptive catalogue.

MOSHER WATER TUBE BOILER CO., NO. 1 BROADWAY, N. Y.

**Detroit Scotch Water Tube Boiler**

Internally Fired.

Scotch and Water Tube types combined, eliminating all objections.

Half the weight of ordinary Scotch boilers.

Standard corrugated furnaces.

Patent applied for.

Investigate before buying any other.

EAST END BOILER WORKS
Detroit, Mich.

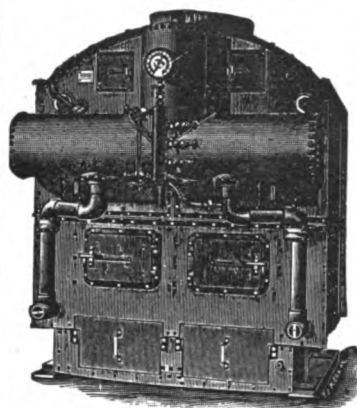
**Taylor Water Tube Boiler Co.**

Vertical Tubes, sectional, large steam space and liberating area.

Fire box, combustion chamber, and course for the furnace gases similar to the Scotch Marine. Free circulation type.

Send for full description.

322 Franklin St.
DETROIT, MICH.

**350 STEAM VESSELS**

Now Equipped With

ALMY'S PATENT SECTIONAL Water Tube Boilers

Bear Evidence of Their Excellent Qualities

ALMY WATER-TUBE BOILER CO.

PROVIDENCE, R. I.

John E. Thropp & Sons Co.

Trenton, N. J.

Builders of

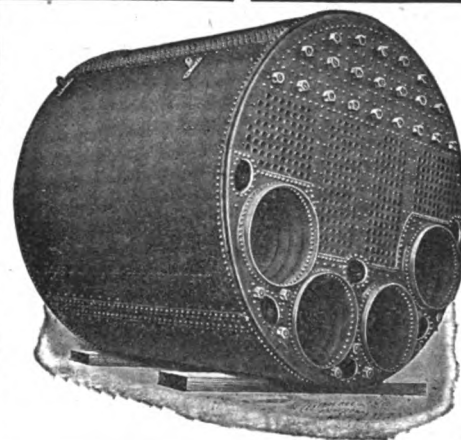
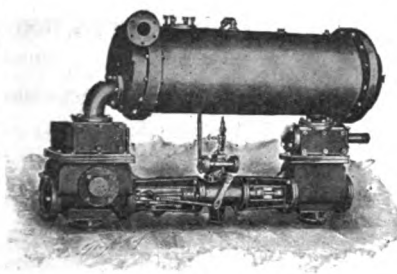
Marine and Stationary Engines and Boilers.

Surface Condensers.

Propeller Wheels and Shafts.

Thrust Bearings.

Machinery of Every Description.

**MARINE BOILERS**

OF ALL TYPES

KINGSFORD
FOUNDRY &
MACHINE
WORKS,

Oswego, N. Y.

Northwestern Steam Boiler & Mfg. Co.

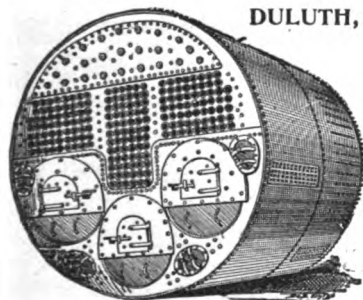
DULUTH, MINN.

Manufacturers of

BOILERS, ENGINES AND MACHINERY

Special facilities for Marine Work. Repairs promptly attended to Night or Day.

We carry a complete line of Marine and Engineers' Supplies.

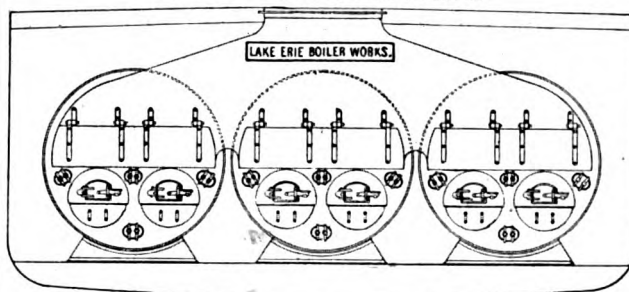


TELEPHONES: OFFICE AND WORKS, 615.

RESIDENCE CALLS: M. A. RYAN, Pres. and Gen'l Mgr., 776-R.
J. H. OPPERMAN, Secretary, 579-R; E. KRIZ, Superintendent, 557-M.

LAKE ERIE BOILER WORKS

RICHARD HAMMOND, President



THE BEST EQUIPPED PLANT IN AMERICA FOR THE MANUFACTURE OF MODERN MARINE BOILERS

BUFFALO, N. Y.

BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in The Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, Marine and Naval Directory of the United States, published by The Marine Review, Cleveland.

[See accompanying Index of Advertisers for full addresses of concerns in this Directory.]

AIR COMPRESSION, HOISTS.
Great Lakes Engineering Works....
.....Detroit.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....
.....New York.

AIR PUMPS AND APPLIANCES.
Fore River Ship & Engine Co.....
.....Quincy, Mass.
Great Lakes Engineering Works....
.....Detroit.

ANCHORS.
Bowers, L. M. & Co.....
.....Binghamton, N. Y.

ANTI-FRICTION METALS.
Cramp, Wm. & Sons....Philadelphia.

ARTIFICIAL DRAFT FOR BOILERS.
American Ship Building Co.....
.....Cleveland.
Detroit Ship Building Co....Detroit.
Great Lakes Engineering Works....
.....Detroit.

ASH EJECTORS.
Great Lakes Engineering Works....
.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....
.....Cleveland.
Hoyt, Dustin & Kelley....Cleveland.
Jenkins, Russell & Eichelberger....
.....Cleveland.
Kremer, C. E.Chicago.
MacDonald, Ray G.....Chicago.
Shaw, Warren, Cady & Oakes.....
.....Detroit.
White, Johnson, McCaslin & Cannon
.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.
Ritchie, E. S. & Sons.....
.....Brookline, Mass.

BELTING (LEATHER.)
Republic Belting & Supply Co.....
.....Cleveland.

BLOCKS, SHEAVES, ETC.
Boston Lockport Block Co.....
.....Boston, Mass.

BLOWERS.
American Blower Co., Detroit, Mich.

BOAT BUILDERS.
Drein, Thos. & Son.....
.....Wilmington, Del.
Kahnweiler's Sons, David.....
.....New York.
Marine Construction & D. D. Co..
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....
.....St. Joseph, Mich.

BOILER COMPOUNDS.
The Bird-Archer Co.....New York
Dearborn Drug & Chemical Works..
.....Chicago.
Lake Erie Boiler Compound Co.....
.....Buffalo
State Manufacturing Co...Cleveland.

BOILER MANUFACTURERS.
Almy Water Tube Boiler Co.....
.....Providence, R. I.
American Ship Building Co.....
.....Cleveland.
Atlantic Works..East Boston, Mass.
Briggs, Marvin.....New York.
Chicago Ship Building Co..Chicago.
Cramp, Wm. & Sons..Philadelphia.
Dearing Water Tube Boiler Co...
.....Detroit.
Detroit Ship Building Co....Detroit.
East End Boiler Works...Detroit.
Fletcher, W. A. & Co.....
.....Hoboken, N. J.
Fore River Shipbuilding Co.....
.....Quincy, Mass.
Great Lakes Engineering Works....
.....Detroit.
Kingston Foundry & Machine
WorksOswego, N. Y.
Lake Erie Boiler Wks.....Buffalo
Maryland Steel Co.....
.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....
.....Milwaukee.
Mosher Water Tube Co..New York.
Newport News Ship Building Co..
.....Newport News, Va.
New York Shipbuilding Co.....
.....Camden, N. J.
Northwestern Steam Boiler & Mfg.
Co.....Duluth, Minn.
Quintard Iron Works Co.....
.....New York.
Roberts Safety Water Tube Boiler
Co.New York.
Superior Ship Building Co.....
.....Superior, Wis.
Taylor Water Tube Boiler Co...
.....Detroit.
Toledo Ship Building Co.....Toledo.

BOILER RIVETS.
Bourne-Fuller Co.....Cleveland.
BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.
Falls Hollow Staybolt Co.....
.....Cuyahoga Falls, O.
BRASS AND BRONZE CASTINGS.
Cramp, Wm. & Sons....Philadelphia.
Fore River Ship & Engine Co.....
.....Quincy, Mass.
Great Lakes Engineering Works....
.....Detroit.
Lunkenheimer Co.....Cincinnati.
BRIDGES, BUILDERS OF.
Scherzer Rolling Lift Bridge Co...
.....Chicago.

BUCKETS, ORE AND COAL.
Brown Hoisting & Conveying Ma-
chine Co.....Cleveland.
G. H. Williams Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.
Martin-Barriss Co.....Cleveland.

CANVAS SPECIALTIES.
Baker & Co., H. H.....Buffalo.
Bunker, E. A.....New York.

Upson-Walton Co.....Cleveland.
Republic Belting & Supply Co....
.....Cleveland.

CAPSTANS.
American Ship Windlass Co.....
.....Providence, R. I.
Dake Engine Co.....
.....Grand Haven, Mich.

Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....
.....New York.

**CEMENT, IRON FOR REPAIR-
ING LEAKS.**
Smooth-On Mfg. Co.....
.....Jersey City, N. J.

CHAIN SURVEYORS, HOISTS.
Brown-Hoisting Machinery Co.....
.....Cleveland.
General Electric Co.....
.....Schenectady, N. Y.

CHAIN HOISTS.
Boston & Lockport Block Co.....
.....Boston, Mass.
Republic Belting & Supply Co....
.....Cleveland, O.

CHARTS.
Penton Publishing Co....Cleveland
**CLOCKS (Marine and Ship's Bell)
AND CHRONOMETERS.**
Ritchie, E. S. & Sons.....
.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co....Cleveland.
Pittsburg Coal Co.....Cleveland

COAL AND ORE HANDLING MACHINERY.
Brown-Hoisting Machinery Co.....
.....Cleveland.

COMPASSES.
Ritchie, E. S. & Son.....
.....Brookline, Mass.

CONDENSERS.
Great Lakes Engineering Works....
.....Detroit.
Thropp & Sons Co., John E.....
.....Trenton, N. J.
Wheeler Condenser & Engineering
Co.....New York.

CONTRACTORS FOR PUBLIC WORKS.

Breyman Bros., G. H.....Toledo.
Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co...
.....Buffalo.
Great Lakes Dredge & Dock Co...
.....Chicago.
Hickler Bros.....
.....Sault Ste. Marie, Mich.
Hubbell Co., H. W..Saginaw, Mich.
Smith Co., L. P. & J. A..Cleveland.
Starke Dredge & Dock Co., C. H..
.....Milwaukee.
Standard Contracting Co..Cleveland.
Sullivan, M.....Detroit

CORDAGE.
Baker & Co., H. H.....Buffalo.
Upson-Walton Co.....Cleveland

G. H. Breymann & Bro's

CONTRACTORS FOR PUBLIC WORKS

Dredging, Dock Building, Etc.

5, 6 AND 7 MARINE BUILDING
TOLEDO, OHIO.

Buffalo Dredging Co.

GENERAL CONTRACTORS ON

SUBMARINE WORK

Office
D. S. Morgan Bldg.

BUFFALO, N. Y.

Automatic Self-Grinding Check Valves

Have you heard **It?**
about or seen

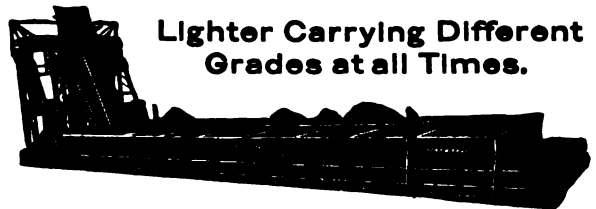
*Descriptive circular sent.
on request*

THE SCOVILLE CHECK VALVE CO.
ASHTABULA, OHIO

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

Lighter Carrying Different
Grades at all Times.



Fuel Scow with elevators and discharging spouts. Storage of 800 tons.
Discharges 250 tons an hour into steamers while unloading cargo.

M. A. Hanna & Co., Miners and Shippers,
Main Office, Perry-Payne Bldg., Cleveland.

Dunbar and Sullivan DREDGING Company

BUFFALO, N. Y.

REMOVE SUBMARINE
ROCK OR EARTH

Hickler Brothers

SAULT STE. MARIE, MICH.

MARINE RAILWAY

Capacity, 1,000 tons. Draft, 7½ ft.
forward, 13½ ft. aft. Length on
keel blocks, 180 ft.; over all, 190 ft.

Machine Shop, Foundry and Steam Forge,
Dredges, Drill Boats and Derrick Scows.

HAWKINS' WORKS FOR ENGINEERS

Popular among young men in the engine departments of ships is
"Engineers' Examinations with Questions and Answers"
Sells at \$2.00, which is the cost delivered, of the following works:

Hawkins' New Catechism of Electricity.
Hawkins' Maxims and Instructions for the Boiler Room.
Hawkins' Hand Book of Calculations for Engineers.
Hawkins' New Catechism of the Steam Engine.

THE MARINE REVIEW, CLEVELAND.

H. W. HUBBELL CO.

Submarine Work
of all kinds

Dredging Hard Material a Specialty.

SAGINAW

MICH.

Buyers' Directory of the Marine Trade.—Continued.

CORK JACKETS AND RINGS.

Armstrong Cork Co., Pittsburg, Pa.
Kahnweiler's Sons, D., New York.

CRANES, TRAVELING.

Brown-Hoisting Machinery Co.,
Cleveland.

DIVING APPARATUS.

Morse, A. J. & Son, Boston.
Schrader's Son, Inc., A., New York.

DREDGING CONTRACTORS.

Breyman & Bros., G. H., Toledo.
Buffalo Dredging Co., Buffalo.
Dunbar & Sullivan Dredging Co.,
Buffalo.
Great Lakes Dredge & Dock Co.,
Chicago.
Hickler Bros., Sault Ste. Marie, Mich.
Hubbell Co., H. W., Saginaw, Mich.
Smith Co., L. P. & J. A., Cleveland.
Starke Dredge & Dock Co., C. H.,
Milwaukee.
Sullivan, M., Buffalo.

DREDGING MACHINERY.

Quintard Iron Works Co., New York.

DRY DOCKS.

American Ship Building Co.,
Cleveland.
Atlantic Works, East Boston, Mass.
Buffalo Dry Dock Co., Buffalo.
Chicago Ship Building Co.,
Chicago.
Cramp, Wm. & Sons, Philadelphia.
Detroit Ship Building Co.,
Detroit.
Great Lakes Engineering Works,
Detroit.
Lockwood Mfg. Co.,
East Boston, Mass.
Milwaukee Dry Dock Co.,
Milwaukee.
Newport News Ship Building Co.,
Newport News, Va.
Shipowners' Dry Dock Co., Chicago.
Superior Ship Building Co.,
Superior, Wis.
Tietjen & Lang Dry Dock Co.,
Hoboken, N. J.
Toledo Ship Building Co., Toledo.

DREDGE BUILDERS.

Manitowoc Dry Dock Co.,
Manitowoc, Wis.

DYNAMOS.

General Electric Co.,
Schenectady, N. Y.
Thropp & Sons, John E.,
Trenton, N. J.

ELECTRIC HOISTS AND CRANES.

General Electric Co.,
Schenectady, N. Y.

ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.,
Schenectady, N. Y.
Thropp & Sons, John E.,
Trenton, N. J.

ENGINE BUILDERS, MARINE.

American Blower Co., Detroit, Mich.
American Ship Building Co.,
Cleveland.
Atlantic Works, East Boston, Mass.
Briggs, Marvin, New York.
Chicago Ship Building Co., Chicago.
Chase Machine Co., Cleveland.
Cramp, Wm. & Sons, Philadelphia.
Detroit Ship Building Co., Detroit.
Fletcher, W. & A. Co., Hoboken, N. J.

ENGINE BUILDERS—Continued.

Fore River Shipbuilding Co.,
Quincy, Mass.
Great Lakes Engineering Works,
Detroit, Mich.
Hall Bros., Philadelphia.
Lockwood Mfg. Co.,
East Boston, Mass.
Maryland Steel Co.,
Sparrows Point, Md.
Milwaukee Dry Dock Co., Milwaukee.
Mosher, Chas. D., New York.
Newport News Ship Building Co.,
Newport News, Va.
New York Ship Building Co.,
Camden, N. J.
Northwestern Steam Boiler & Mfg.
Co., Duluth, Mich.
Quintard Iron Works Co., New York.
Roach's Ship Yard, Chester, Pa.
Sheriffs Mfg. Co., Milwaukee.
Superior Ship Building Co.,
Superior, Wis.
Thropp, J. E. & Sons Co.,
Trenton, N. J.
Toledo Ship Building Co., Toledo.
Trout, H. G., Buffalo.

ENGINE ROOM TELEGRAPH CALL BELLS, ETC.

Cory, Chas. & Son, New York.
Marine Mfg. Supply Co., New York.

ENGINEERING SPECIALTIES AND SUPPLIES.

Lunkenheimer Co., Cincinnati.
Northwestern Steam Boiler & Mfg.
Co., Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander, Cleveland.
Hunt, Robt. W. & Co., Chicago.
Kidd, Joseph, Duluth, Minn.
Mosher, Chas. D., New York.
Nacey, James, Cleveland.
Roelker, H. B., New York.
Wood, W. J., Chicago.

FANS.

American Blower Co., Detroit, Mich.

FEED WATER PURIFIERS AND HEATERS.

Ross Valve Co., Troy, N. Y.
Wheeler Condenser & Engineering
Co., New York.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.,
Schenectady, N. Y.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.,
Cleveland.
Fore River Shipbuilding Co.,
Quincy, Mass.

FLUE WELDING.

Fix's S. Sons, Cleveland.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co., Cleveland.
Parker Bros. Co., Ltd., Detroit.
Pickands, Mather & Co., Cleveland.
Pittsburg Coal Co., Cleveland.
Smith, Stanley B., & Co., Detroit.
Toledo Fuel Company, Toledo, O.

FURNACES FOR BOILERS.

Continental Iron Works, New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.,
New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co., Cleveland.

GAUGES, STEAM AND VACUUM.

Lunkenheimer Co., Cincinnati.

GAUGES, WATER.

Lunkenheimer Co., Cincinnati, O.

GENERATING SETS.

General Electric Co.,
Schenectady, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph, N. J.
Jersey City, N. J.

HAMMERS, STEAM.

Chase Machine Co., Cleveland.

HEATING AND VENTILATING APPARATUS.

American Blower Co., Detroit, Mich.

HOISTS FOR CARGO, ETC.

American Ship Building Co.,
Cleveland.
Brown Hoisting Machinery Co.,
Cleveland.
Chase Machine Co., Cleveland.
Dake Engine Co.,
Grand Haven, Mich.
General Electric Co., New York.
Hyde Windlass Co., Bath, Me.
Marine Iron Co., Bay City.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.,
Cuyahoga Falls, O.

HYDRAULIC DREDGES.

Great Lakes Engineering Works,
Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The,
New York.

ICE MACHINERY.

Great Lakes Engineering Works,
Detroit.
Roelker, H. B., New York.

INJECTORS.

American Injector Co., Detroit.
Jenkins Bros., New York.
Lunkenheimer Co., Cincinnati.
Penberthy Injector Co.,
Detroit, Mich.

INSURANCE, MARINE.

Elphicke, C. W. & Co., Chicago.
Gilchrist & Co., C. P., Cleveland.
Hawgood & Co., W. A., Cleveland.
Helm & Co., D. T., Duluth.
Hutchinson & Co., Cleveland.
McCarthy, T. R., Montreal.
McCurdy, Geo. L., Cleveland.
Mitchell & Co., Cleveland.
Parker Bros. Co., Ltd., Detroit.
Peck, Chas. E. & W. F.,
New York and Chicago.
Prindiville & Co., Chicago.
Richardson, W. C., Cleveland.
Sullivan, D. & Co., Chicago.

M. SULLIVAN

DREDGING OF ALL KINDS

THE REMOVING OF DEEP
WATER EARTH AND ROCK
A SPECIALTY.

721 West Ferry St.
BUFFALO, - - - N. Y.

THE
Standard Contracting Co.

ENGINEERS AND CONTRACTORS

For Railroads, Dredging, Dock Build-
ing, Concrete, Submarine work, &c.

Wade Building

Cleveland, Ohio

C. H. STARKE DREDGE & DOCK CO.,

Contractors for Public Works.

DREDGING, PILE DRIVING,
—AND—
SUBMARINE PIPE LAYING.

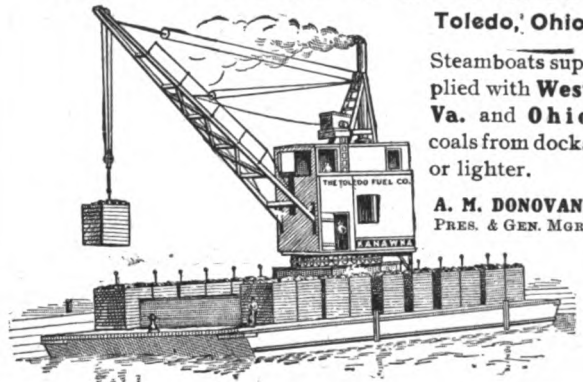
Canal Street, West of First Avenue,
Milwaukee, - - Wisconsin.

The Toledo Fuel Co.

Toledo, Ohio

Steamboats sup-
plied with West
Va. and Ohio
coals from docks
or lighter.

A. M. DONOVAN,
PRES. & GEN. MGR.



LATEST PATENT ANCHOR

THE NATIONAL

APPROVED BY LLOYDS.

Manufactured by

L. M. BOWERS & CO.,

Binghamton, N. Y.

Catalogue on Application.

The National and Inter-
national

ANCHORS.

Furnished to the Lake Trade
by

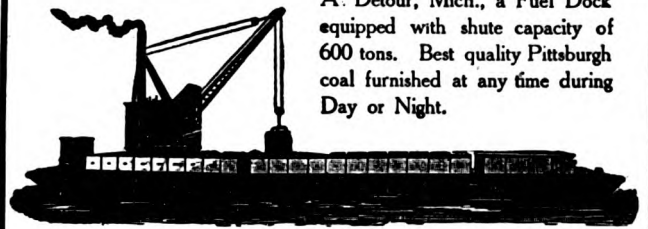
The Upson-Walton Co.,

CLEVELAND, O.

**PICKANDS, MATHER & CO.**

FUEL LIGHTERS at Buffalo, Erie, Ashtabula and Cleveland.

A. Detour, Mich., a Fuel Dock
equipped with chute capacity of
600 tons. Best quality Pittsburgh
coal furnished at any time during
Day or Night.



Western Reserve Building,

CLEVELAND, O.

New Fast Train to Columbus
THE COLUMBUS FLYER

Via

BIG FOUR ROUTE

Leaves Union Station 6:15 p. m., daily except Sunday, with
combination Baggage and Smoking Car, highback coaches
and Pullman Buffet Parlor Cars (serving light supper en-
route), Stopping at Wellington, New London, Shelby,
Crestline, Galion and Delaware and arrives at Columbus
9:35 p. m. Get tickets and Pullman seats at Big 4 Ticket
office, No. 532 Euclid Avenue or Union Depot.

THIS IS A VERY FAST **Try It**
TRAIN

**CATALOGS
WANTED.**

We are requested to in-
form the INDUSTRIALS
of all branches that our
French contemporary,
"LE MOIS SCIENTIFIQUE ET INDUS-
TRIEL" of 8 rue Nouvelle
at PARIS, 9°, has estab-

lished an Information Branch from which particulars on any
question may be obtained.

It is of great interest for all manufacturers to send
regularly their "Catalogues" to "Le Mois Scientifique et
Industriel" from where they will be forwarded to every one
interested in the line.

Do not delay to send them and note the address is

LE MOIS SCIENTIFIQUE ET INDUSTRIEL
8 rue Nouvelle at Paris--9°

Ask for a specimen notice free on application.

Buyers' Directory of the Marine Trade---Continued.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland, O.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co., Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Truscott Boat Mfg. Co.....
.....St. Joseph, Mich.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co.....Pittsburg.
Carley Life Float Co.....
.....New York, N. Y.
Drein, Thos. & Son.....
.....Wilmington, Del.
Kahnweiler's Sons, D.....New York.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson.....Buffalo.

LOGS.

Nicholson Ship Log Co., Cleveland.
Walker & Sons, Thomas.....
.....Birmingham, Eng.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....
.....Jersey City, N. J.

LUBRICATORS.

Lunkenheimer Co. Cincinnati.

LUMBER.

Martin-Barriss Co. Cleveland.

MACHINISTS.

Chase Machine Co.....Cleveland.
Hickler Bros., Sault Ste. Marie, Mich.
Lockwood Mfg. Co.....
.....East Boston, Mass.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc....Philadelphia.

MARINE RAILWAYS.

Hickler Bros., Sault Ste. Marie, Mich.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....
.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....
.....Cleveland.
Detroit Ship Building Co., Detroit.
Great Lakes Engineering Works....
.....Detroit.

METALLIC PACKING.

Katzenstein, L. & Co., New York.
The National Metallic Packing Co..
.....Oberlin, O.

MOTORS, GENERATORS—ELECTRIC.

General Electric Co.....
.....Schenectady, N. Y.

NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....
.....Brookline, Mass.

NAVAL ARCHITECTS.

Hynd, AlexanderCleveland
Kidd, JosephDuluth, Minn.
Mosher, Chas. D.....New York.
Nacey, JamesCleveland
Wood, W. J.....Chicago

OAKUM.

Stratford, Oakum Co.....
.....Jersey City, N. J.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....
.....Jersey City, N. J.

PACKING.

Jenkins Bros.....New York.
Katzenstein, L. & Co.....New York.
Robertson, Jos. L. & Sons.....
.....New York.
The National Metallic Packing Co..
.....Oberlin, O.
Republic Belting & Supply Co.....
.....Cleveland, O.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. .Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
Dunbar & Sullivan Dredging Co....
.....Buffalo.
Great Lakes Dredge & Dock Co....
.....Chicago.
Hickler Bros., Sault Ste. Marie, Mich.
Hubbell Co., H. W...Saginaw, Mich.
Parker Bros. Co., Ltd.....Detroit.
Smith Co., L. P. & J. A...Cleveland.
Starke Dredge & Dock Co., C. H...
.....Milwaukee.
Sullivan, M.....Detroit.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland, O.

PLANING MILL MACHINERY.

Atlantic Works, Inc....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

PRESSURE REGULATORS.

Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....
.....Cleveland.
Atlantic Works ..East Boston, Mass.
Cramp, Wm. & Sons..Philadelphia.
Detroit Ship Building Co....Detroit.
Fore River Shipbuilding Co.....
.....Quincy, Mass.
Great Lakes Engineering Works....
.....Detroit.
Hyde Windlass Co.....Bath, Me.
Lockwood Mfg. Co.....
.....East Boston, Mass.
Milwaukee Dry Dock Co.....
.....Milwaukee.
Newport News Ship Building Co..
.....Newport News, Va.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....
.....Superior, Wis.
Thropp & Sons Co., J. E.....
.....Trenton, N. J.
Toledo Ship Building Co.....Toledo.
Trout, H. G.....Buffalo.

PROJECTORS, ELECTRIC.

General Electric Co.....
.....Schenectady, N. Y.

PUMPS FOR VARIOUS PURPOSES.

Great Lakes Engineering Works..
.....Detroit.
Kingsford Foundry & Machine
WorksOswego, N. Y.
Wheeler Condenser & Engineering
Co.New York.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works....
.....Detroit.
Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Cleveland.

RIVETS, STEEL FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland, O.

RUBBER SUPPLIES.

Republic Belting & Supply Co.....
.....Cleveland, O.

SAFETY VALVES.

Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co....Buffalo.
Upson-Walton Co.....Cleveland.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

General Electric Co.....
.....Schenectady, N. Y.

SHEARS.

See Punches, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland, O.
Otis Steel Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....
.....Cleveland.
Atlantic Works ..East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Collingwood Shipbuilding Co.....
.....Collingwood, Ont.
Cramp, Wm. & Sons..Philadelphia.
Chicago Ship Building Co..Chicago.
Detroit Ship Building Co....Detroit.
Fore River Ship Building Co.....
.....Quincy, Mass.
Great Lakes Engineering Works....
.....Detroit.
Lockwood Mfg. Co.....
.....East Boston, Mass.
Manitowoc Dry Dock Co.....
.....Manitowoc, Wis.
Maryland Steel Co.....
.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....
.....Milwaukee.
Newport News Ship Building Co..
.....Newport News, Va.
New York Shipbuilding Co.....
.....Camden, N. J.
Roach's Ship Yard....Chester, Pa.
Shipowner's Dry Dock Co..Chicago.
Toledo Ship Building Co.....Toledo.

SHIP CHANDLERS.

Baker, Howard H. & Co....Buffalo.
Marine Mfg. & Supply Co.....
.....New York.
Upson-Walton Co.....Cleveland.

SHIP DESIGNERS.

Kidd, JosephDuluth.
Steel, Nacey, & Hynd....Cleveland.
Wood, W. J.....Chicago

ESTABLISHED, 1854.



SHERIFFS

MANUFACTURING CO.

Manufacturers of
**PROPELLER
WHEELS**

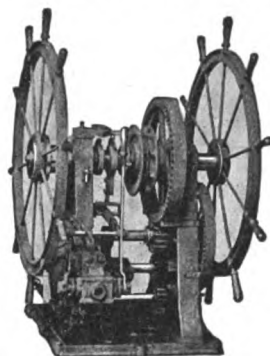
Marine Engines
and Repairs.

Milwaukee, Wis.

Phone 5. 163

Dake Pilot House

Steam Steerer



For Tugs and Steamers.
Simple, Durable, Effi-
cient and practically
noiseless. Can easily
be changed to hand
gear if necessary.

DAKE ENGINE CO.,

Grand Haven, Mich.

Try Dixon's Graphite At Our Expense

We *know* what Dixon's Flake Graphite will do.
It will reduce friction, save coal and oil, lessen
labor, prevent wear and repairs. We want you
to *know* all this, and will gladly send liberal
sample "77-C" free to prove it.

JOSEPH DIXON CRUCIBLE COMPANY

JERSEY CITY, N. J.

BELTING

THE REPUBLIC BELTING & SUPPLY CO.,

Cleveland, O.

FORMERLY THE BODIFIELD BELTING CO.

Manufacturers of

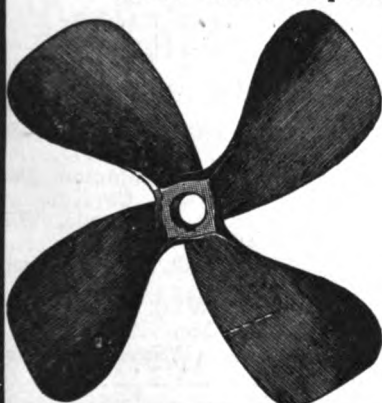
LEATHER BELTING

"Republic" Mechanical Rubber Goods.

Capt. J. C. Dobson, formerly of the Gilchrist Transit Company
and the Cleveland Cliffs Iron Company, has entered our employ and
will have charge of our marine business.

**LEATHER-RUBBER
— CANYAS-COTTON —**

Thirty Years' Experience building



**Engines
and
Propeller
Wheels.**

H. G. TROUT,

King Iron Works,

226 Ohio St.,

BUFFALO, N. Y.

Aids to Navigation

are of vital importance to vessel interests.

SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all
vessel interests, because of the wide and unobstruc-
ted channel provided for navigation, enabling vessels
to pass easily and rapidly through the draw.

The Scherzer Rolling Lift Bridge Co.

Main Offices: 1616 Monadnock Block,

CHICAGO, U. S. A.

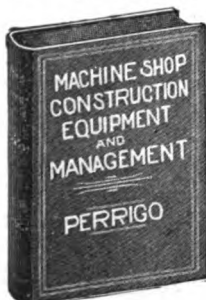
A Practical Book for Practical Men

Just published

By Oscar E. Perrigo, M. E.

342 pages—208 illustrations.

The only work published that
describes the modern shop from its
inception until the shipment of the
finished article. Contains many val-
uable suggestions as to the construc-
tion, equipment, arrangement and
management of the various parts of
the manufacturing plant.



Cloth—Price \$5. For Sale by

THE PENTON PUBLISHING CO., Cleveland, O.

GEO. STRATFORD OAKUM CO.

JERSEY CITY, NEW JERSEY.

Established
1860

Manufacturers
of all grades of

Oakum

Spun
Cotton



FOR SALE AT SHIP CHANDLERS EVERYWHERE.

Buyers' Directory of the Marine Trade---Continued.

SHIP LANTERNS AND LAMPS.

Upson-Walton Co.....Cleveland.

SHIP TIMBER.

Martin-Barriss Co.....Cleveland.

SIGNALS—SUBMARINE.

Submarine Signal Co.....Boston

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....

.....Jersey City, N. J.

STAYBOLT IRON OR STEEL BARS, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....

.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Holmes, SamuelNew York.

McCarthy, T. R.....Montreal, Can.

STEAMSHIP LINES, PASS, AND FREIGHT.

American LineNew York.

Anchor LineBuffalo.

Boston SteamshipBoston.

C. & B. Transit Co.....Cleveland.

International Mercantile Marine Co.

.....Philadelphia.

Mallory LineNew York.

New York & Cuba Mail S. S. Co..

.....New York.

Red Star LineNew York.

STEAM SPECIALTIES.

Robertson, Jas. L. & Sons ..New York.

STEEL CASTINGS.

Otis Steel Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....

.....Cleveland.

Chase Machine Co.....Cleveland.

Dake Engine Co.....

.....Grand Haven, Mich.

Detroit Ship Building Co.....Detroit.

Hyde Windlass Co.....Bath, Me.

Marine Mfg. & Supply Co.....

.....New York.

Sheriffs Mfg. Co.....Wilwaukee.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.

Schrader's Son, Inc. A....New York.

SURVEYORS, MARINE.

Hynd, AlexanderCleveland.

Parker Bros. Co., Ltd.....Detroit.

Nacey, JamesCleveland.

Steel, AdamCleveland.

Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co....Chicago.

Lunkenheimer Co....Cincinnati, O.

THERMIT

Goldschmidt Thermit Co.,

.....New York City.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....

.....Providence, R. I.

Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co..

.....Kingston, Ont.

Great Lakes Towing Co..Cleveland.

TRUCKS.

Boston & Lockport Block Co.....

.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co..Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

Jenkins Bros.New York

Lunkenheimer Co.....Cincinnati.

Ross Valve Co.....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ashton Valve Co.,.....Boston.

Lunkenheimer Co.....Cincinnati.

Republic Belting & Supply Co.....

.....Cleveland, O.

Ross Valve Co.....Troy, N. Y.

Scoville Check Valve Co.....

.....Ashtabula, O.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.

Douglas, G. L. Jr.....Duluth

Elphicke, C. W. & Co.....Chicago.

Hall, John B.....Buffalo.

Helm & Co., D. T.....Duluth.

Hawgood & Co., W. A....Cleveland.

Holmes, SamuelNew York.

Hutchinson & Co.....Cleveland.

McCarthy, T. R.....Montreal.

VESSELS AND FREIGHT AGENTS—Con.

Mitchell & Co.....Cleveland.

Parker Bros. Co., Ltd.....Detroit.

Prindiville & Co.....Chicago.

Richardson, W. C.....Cleveland.

Sullivan, D. & Co.....Chicago

WATER GAUGES.

Lunkenheimer Co....Cincinnati, O.

WHISTLES, STEAM.

Lunkenheimer Co.....Cincinnati.

WILFORD'S WATERPROOF CLOTH.

Bunker, E. A.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.

Upson-Walton Co.....Cleveland.

WINDLASSES.

American Ship Windlass Co.....

.....Providence, R. I.

American Ship Building Co.....

.....Cleveland.

Dake Engine Co.....

.....Grand Haven, Mich.

Hyde Windlass Co.....Bath, Me.

Marine Mfg. & Supply Co.....

.....New York.

WINCHES.

American Ship Windlass Co.....

.....Providence, R. I.

Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co..

.....Kingston, Ont.

Great Lakes Towing Co..Cleveland.

Parker Bros. Co., Ltd.....Detroit.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....

.....Wilmington, Del.

Manitowoc Dry Dock Co.....

.....Manitowoc, Wis.

Truscott Boat Mfg. Co.....

.....St. Joseph, Mich.

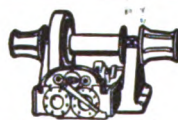
YAWLS.

Drein, Thos. & Son.....

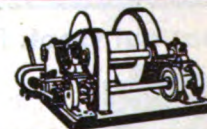
.....Wilmington, Del.

**GASOLINE MARINE ENGINES**

Suitable for all Boats from 3½ to 200 HP.
Over 100 in successful use.
Also the well known and always
reliable Woolters Gas or Gasoline
Stationary Engines.

**HOISTING ENGINES**

Of all kinds and sizes, and
for all purposes, especially
for ship use.
Docking and Hauling Engines
and Wire Rope Windlasses.

**AUTOMATIC TOWING MACHINES**

Somewhat the cheapest, and
altogether the best. Positively
guaranteed.
Automatic Fog Whistle Machines
Steam Steering Engines.

FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.

THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.

Ashtabula Directory

Reliable merchants with which to do business
in the greatest iron ore port in the world

CHECK VALVES.

Scoville Check Valve Co.

CLOTHIERS AND OUTFITTERS.

Buffalo Clothing Store,
opp. Marine Bank.

Burnett, Geo. W.

Carlisle, H. T. & L. T.,
75-77 Bridge St.

The Globe Clothiers,
81 Bridge St.

COAL AND JUNK.

Sheldon, G. F.
East End of Bridge.

DRUGS, TOILET ARTICLES, ETC.

Turner, J. G. & Co.,
95 Bridge St.

INSURANCE.

Watrous, J. W.,
220 Main St.

MACHINISTS.

McKinnon Iron Works.
McLaughlin Iron Works.

MARINE HARDWARE.

Topky Brothers.
Cheney, H. P. Sons.
15-17 Bridge St.

MEATS AND ICE.

Burill, E. H.
68 Bridge St.
Rennick, Tom J.
Ashtabula Harbor.

PHOTOGRAPHER.

Sahlestein, John,
31 Hulbert St.

SHIP CHANDLERS.

Cheney, H. P. Sons.
15-17 Bridge St.
Topky Brothers.

SHIP REPAIRS.

McKinnon Iron Works.
McLaughlin Iron Works.

SHIP SUPPLIES.

Miller, E. S.,
63 Bridge St.
Topky Brothers.

SOUVENIR POST CARDS.

Lee, John J.,
25 Market St.
Sahlestein, John,
31 Hulbert St.

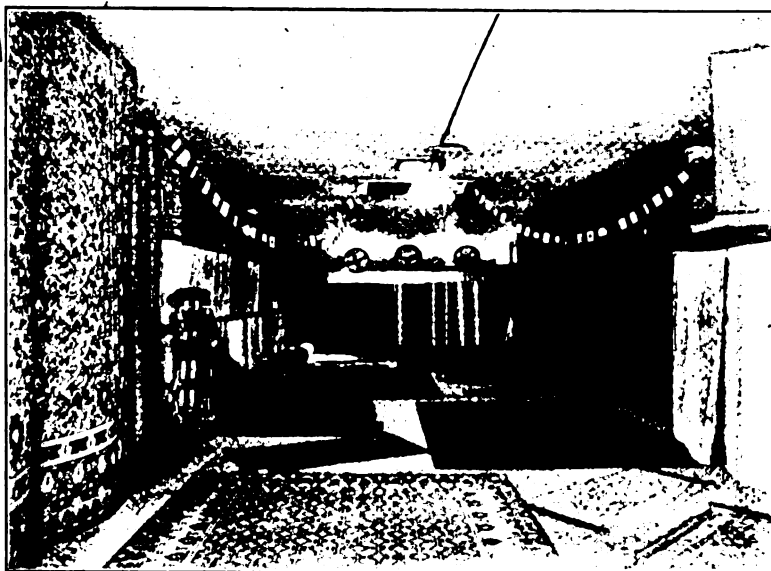
TYPEWRITERS.

Lee, John J.,
25 Market St.

Carlises

Established
1866

We invite
a
comparison
of
Our Prices



Section of Carpet Department of H. T. & L. T. Carlisle

Carlises

75-77
Bridge St.

We guarantee
satisfaction
in
all cases

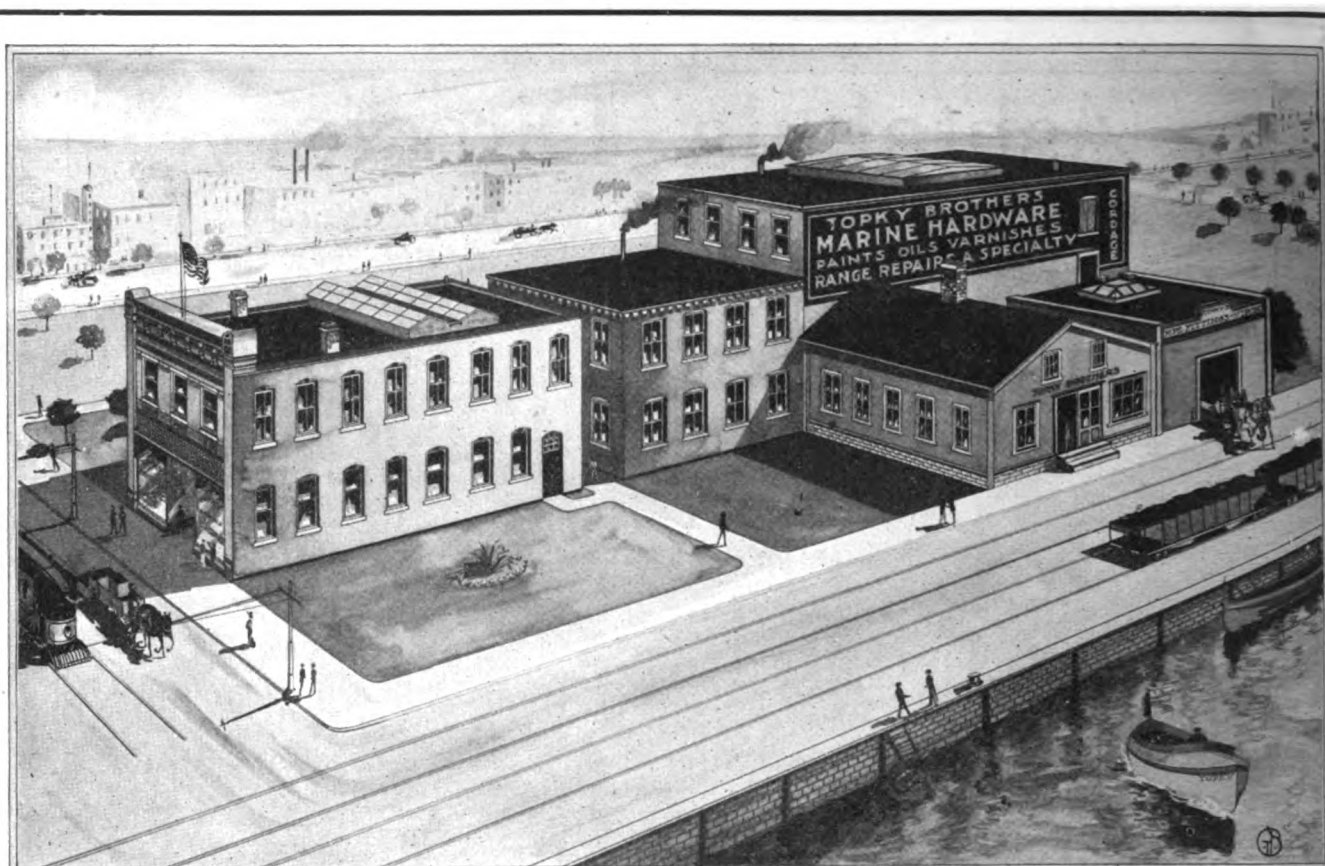
Are You From Missouri?

The Big Harbor Store would like to Show You the Largest Stock of Dry Goods, Carpets, Linoleums, Cloaks, Suits, Furs and Men's Furnishings to be found between Erie and Cleveland.

BOAT OUTFITTING A SPECIALTY

Special attention given to all boat orders. Large Line of Linoleums, both imported and domestic in stock at all times.

H. T. & L. T. CARLISLE, ASHTABULA, O.



TOPKY BROTHERS

SHIP CHANDLERS

ESTABLISHED 1886

Ashtabula Harbor, Ohio

Marine and Heavy Hardware,
Pipe Fittings, Valves and
Packing. Electrical Goods,
Cordage. Agents for Russell
& Watson and Born Steel
Ranges.

Our Complete Equipment
enables us to fit out the
forward or after end of a
boat on short notice.



G. F. SHELDON

Junk and Coal Dealer

**BEST GRADES OF ANTHRACITE
CONSTANTLY ON HAND**

Up-to-date facilities.

**Dock at East End
of Bridge.**

Iron and Brass Foundry
in Connection

Phone, Main 785
Bell 135 W

McLaughlin Iron Works

Engines, Boilers, Mill
Machinery and
General Repairing

Marine Repair Work a specialty.

180 Center Street

ASHTABULA, OHIO

McKINNON IRON WORKS

ASHTABULA, O.

ANNOUNCEMENT

We are still prepared to take care of the Marine trade at Ashtabula. The fire burned us out completely, but we have erected a temporary machine and blacksmith shop in which to do your bidding until our new plant is completed about Dec. 1st.

¶ We have also a new and complete line of Engineers' supplies. Temporary office Cheney's store. New office will be erected in 30 days.

McKinnon Iron Works.

E. S. MILLER

63 Bridge St., Ashtabula Harbor, O.

Ship Supplies

Staple and Fancy
Groceries
Crockery and Glassware

Bell 'Phone 154 R

Harbor Local 'Phone 432



When Buying a Typewriter

Select one that has the three essentials of the standard high priced machines:

- 1st. Universal Keyboard
- 2nd Powerful Manifolding (ten good copies or more)
- 3rd Mimeograph Stencil Cutting

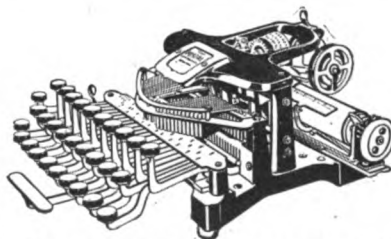
The POSTAL is the only low priced machine combining these three essentials; in addition it has visible writing, interchangeable type, is strongly built, and weighs ten and one-half pounds. Ask for booklet.

JOHN J. LEE

25 Market St., Ashtabula Harbor, Ohio.

Phone, Harbor 504

P. O. Box 82



Great Book for Navigators

MODERN SEAMANSHIP

Lieut. Commander

Austen M. Knight

Is the title of a book which has just been written by Lieut. Comd'r Austen M. Knight, executive officer of the cruiser Olympia. The title of the volume could not be more appropriate. Seamanship is as old as the deluge. From century to century, through the connecting link of generations, seamanship has been handed down to us. Until as late as forty years ago seamanship was the supreme art of the sea.

But changes, wonderful to contemplate, have marked the last half century. The name of the great revolution was steam. Through its agency seamanship lost its old command. It became subordinate to the science of navigation. All existing volumes upon seamanship speedily became obsolete. But yesterday of unquestioned authority, today they are merely junk. Such is the moving panorama of the world's progress that its views appear, like opportunity, but once upon the scene and are gone. How appropriate, therefore, is its title "Modern Seamanship." It has to do with seamanship as it exists today, when every sea is charted, when even the rise and fall of the tides in every part of the world is computed by machinery, when hurricanes can hurl their awful force against the ocean liner—not to destroy but merely to check. "The hurricane reached its maximum of twelve and the Kronprinz Wilhelm checked down"—the dispatches will say. Checked down to what? To 19 knots. Twenty-five years ago there wasn't a steamship afloat that could make 19 knots in the smoothest sea that ever was sailed. This is the seamanship the book deals with. It embraces all, the old and the new, but its great virtue is that it is distinctly modern.

We are in the business of handling books, but when the printer sent us this product of his handiwork, we complimented him. It is a large book but it is superb to the least detail of its 428 pages, to which must be added 136 of the finest and clearest plates we have ever seen. No book has received more favorable notices. Even the daily press, usually as dumb as oysters when a technical volume appears, have devoted columns to it. It has been adopted as a text book at the United States Naval Academy. We should think that every person interested in modern seamanship, in the science of navigation, in the building, equipping and managing of a ship would want it. We shall be glad to send it to anyone.

The Price is \$6.00

BOOK DEPARTMENT

The Penton Publishing Co.

CLEVELAND

PRESCRIPTIONS A SPECIALTY



**Drugs
Medicines
Toilet Articles
Stationery**

J. G. TURNER & CO.

95 Bridge Street, Cor. Hulbert,
ASHTABULA, O.

D. S. CHENEY

T. A. CHENEY

R. S. CHENEY

CUYAHOGA AND BELL
TELEPHONE

P. H. CHENEY-SONS

GROCERS AND SHIP CHANDLERS

Marine Hardware, Paints, Oil's, Varnishes

15 and 17 Bridge Street
ASHTABULA, OHIO

**YOU WILL MAKE NO
MISTAKE IN GIVING
BURRILL YOUR ORDER
FOR MEATS AND ICE.**

68 BRIDGE ST., ASHTABULA HARBOR

**Souvenir Post Cards of the Great-
est Iron Ore Port in the World**

Your collection is not
complete without them.

Special 30 day offer: 5 differ-
ent views for 10c, mailed
separately for 5c extra.

Special prices to dealers. Post Cards of your own
locality made to order. Also a full line of Artistic
and fancy post cards and refined comics.

JOHN J. LEE

25 Market St., Ashtabula Harbor, Ohio.

Phone Harbor 504

P. O. Box 82

Let me put you on my exchange list.

While in Ashtabula

If you want a SCOTTY MILWAUKEE SWEATER,
a RAINO WATER PROOF COAT, OILSKINS,
GOODYEAR OR CANDEE RUBBER BOOTS,
perhaps a pair of WALKOVER SHOES, call on

GEO. W. BURNETT

Under Lake Seamen's Union

87 Bridge St.

CALL AT THE
Buffalo Clothing Store

ASHTABULA HARBOR, OHIO

AGENTS FOR

W. L. DOUGLAS SHOES AND CARHART OVERALLS

Opp. Marine Bank.

**TOM J. RENNICK
MEATS AND ICE**

The best meats and
service in the city

Western Steer Beef
handled exclusively

ASHTABULA HARBOR, O.

Launch Delivery

Bell, 161 K
Phones: Local, Market, 408 H
Res. 395 H

Accidents will happen on the best regulated boats
Insure yourself against accidents and sickness in

THE AETNA LIFE INS. CO.

HARTFORD, CT.

The strongest company in the world writ-
ing life, accident and health insurance

See **J. W. WATROUS, Dist. Agt.**

OFFICE 220 MAIN ST., ASHTABULA, O.

Liberal Policies.

Quick Settlements.

Long Dist. Phone.

The
Globe

**CLOTHIERS and
OUTFITTERS**

Clothing, Furnishings,
Shoes and Boots, Trunks
and Bags, Carhart Over-
alls, Oilskin Coats and
Suits.

(Union Store)

ASHTABULA HARBOR

81 Bridge St.

VESSEL AND INSURANCE AGENTS.

FRED P. BELCHER,
Vessel and Insurance Agent,
430 Grain Exchange,
WINNIPEG, MAN.
P. O. Box 230.

JOHN J. BOLAND & CO.,
Vessel and Insurance Agents.
800-804 Prudential Bldg.
Both Phones. BUFFALO, N. Y.

C. W. Elphicke. J. J. Rardon.
C. W. ELPHICKE & CO.
Vessel and Insurance Agents.
No. 6 Sherman St. CHICAGO, ILL.
Telephone, Harrison 1194.

JOHN B. HALL,
Vessel Agent.
17 Exchange Bldg., 202 Main St.,
Telephone, Seneca 892.
BUFFALO, N. Y.

W. A. Hawgood. Arthur H. Hawgood.
W. A. HAWGOOD & CO.
Vessel and Insurance Agents.
220-21 Perry-Payne Bldg., Cleveland, O.
Telephones: { Office, Main 2395.
{ Res. W. A. Hawgood, Doan 84-J.
{ Res. A. H. Hawgood, Doan 841-J.

D. T. HELM & CO.
Vessel and Insurance Agents.
Telephones—Office 263.
—Res. 381-3.
DULUTH, - - - MINN.

SAMUEL HOLMES,
Steamship Offices,
For Selling, Chartering and Building all
Classes Steam Vessels.
Steam Vessel Circulars
Weekly Freight Circulars.
Morris Bldg., 66-8 Broad St., New York.

C. L. Hutchinson. W. H. McGean.
HUTCHINSON & CO.
Vessel and Insurance Agents.
Phones: { Office, Main 2453.
{ Res. C. L. Hutchinson, Lake 244.
{ Res. W. H. McGean, Doan 274.
1408 Rockefeller Bldg. Cleveland.

G. L. DOUGLASS, JR.,
Vessel Agent.
DULUTH, MINN.
Telephones: Office { Bell 878
{ Zenith 14.
Residence. Bell 561.

FRANK MAYTHAM,
Attorney and Counsellor at Law
Proctor in Admiralty.
10 Marine Exchange Bldg., BUFFALO, N. Y.

VESSEL AND INSURANCE AGENTS

T. R. MCCARTHY,
Steamship and Freight Broker.
Chartering, Forwarding and General Com-
mission Agent; and Broker for the Sale,
Purchase and Construction of Steamers
and Sailing Vessels.
Cable Address, "Macarthy, Montreal."
(Watkins', Scott's Liebers and A. B. C.
Codes Used.)
Shipping Agent to The Asbestos & Asbestos
Co., Ltd., of Asbestos Que. The Belgo
Canadian Pulp & Paper Co., Ltd., of
Shawinigan Falls, Que. Edward Lloyd, Ltd.
Paper Manufacturer, of London (Eng.).
404 Board of Trade Bldg., MONTREAL, CAN.
Correspondence Invited and Agencies
Solicited.

J. Mitchell. J. F. Wedow. A. Mitchell.
MITCHELL & CO.
Vessel and Insurance Agents
1504-6-8 Rockefeller Bldg., Cleveland, O.
Office Tel. M. 767. Res. John Mitchell, Doan 341.
John F. Wedow, Doan 141-J.
Alfred Mitchell, Doan 218.

PARKER BROS. CO., LTD.,
Vessel, Marine Insurance and Wreck-
ing Agents. Marine Surveyors.
Office Tel. Main 5314. Night: Main 290
Night: Grand 1723 J.
15 Atwater St. West, DETROIT, MICH.

W. C. RICHARDSON,
Vessel Owner and Broker and
Marine Insurance Agent.
420-421 Perry Payne Building,
CLEVELAND, O.
Office Tel. 338. Residence Tel. 2938.

D. Sullivan. F. J. Sullivan.
D. SULLIVAN & CO.
Vessel Agents.
Marine Insurance.
2-4 Sherman St., CHICAGO, ILL.
Office Tel., Harrison 2847. Res. Ashland 2483.

NAVAL ARCHITECTURE,
by
THOS. H. WATSON.
A manual on laying off iron and steel
vessels. Valuable for naval architects as
well as beginners in ship yards.

Price, \$5.00.
Order from
THE PENTON PUB. CO.,
Cleveland, O.

VANCE & JOYS CO.
Vessel and Insurance Agents
No. 21 NEW INSURANCE BUILDING,
TELEPHONE MAIN 99.
MILWAUKEE, WIS.

T. R. BILLET, JR.,
Vessel Agent
811 Union Bank Building,
WINNIPEG.

PROCTORS IN ADMIRALTY.

ALBERT J. GILCHRIST,
Proctor in Admiralty.
Rockefeller Building,
CLEVELAND, O.

GOULDER, HOLDING &
MASTEN,
Law Offices.
H. D. Goulder. S. H. Holding. F. S. Masten.
Perry-Payne Building,
CLEVELAND, O.

HOYT, DUSTIN & KELLEY,
Lawyers and Proctors in Admiralty.
Offices, 702 Western Reserve Bldg.,
CLEVELAND, O.

JENKINS, RUSSELL
& EICHELBERGER,
Attorneys-at-Law
and Proctors in Admiralty.
1520 Rockefeller Bldg. CLEVELAND.

C. E. KREMER,
Counselor at Law and
Proctor in Admiralty.
Suite 1505-1506-1507 Fort Dearborn Bldg.,
CHICAGO, ILL.

RAY G. MACDONALD,
Attorney-at-Law and
Proctor in Admiralty.
1018 Hartford Building,
Telephone, Central 2484 CHICAGO, ILL.

SHAW, WARREN, CADY &
OAKES,
Attorneys-at-Law.
and Proctors in Admiralty.
Union Trust Bldg., Detroit, Mich.

WHITE, JOHNSON,
McCASLIN & CANNON,
Attorneys-at-Law and
Proctors in Admiralty.
Williamson Bldg., CLEVELAND, O.

MARINE INSURANCE,
by
WILLIAM GOW.
Price, \$1.50.
THE PENTON PUB. CO.,
Cleveland, O.

AN ADVERTISEMENT
IN THE
MARINE REVIEW
Will make your goods move faster.

PROFESSIONAL.

ROBERT W. HUNT & CO.,

*Bureau of Inspection.
Tests and Consultation.*

1121 The Rookery, CHICAGO.
Monong. Bank Bldg., PITTSBURG.
66 Broadway, NEW YORK.

Inspectors of shipbuilding material and machinery. Inspectors of all materials. Duty tests of engines and boilers. Physical and chemical laboratories.

PROFESSIONAL.

James Nacey. Alexander Hynd.

NACEY & HYND,
*Marine Architects.
Mechanical Draughtsmen.
Consulting Engineers.*

Specifications and designs for all descriptions of marine vessels, engines and boilers. Supervision of construction and repairs. Damage and other surveys carefully attended to.

Agents for Marine Specialties.

208-9 Western Reserve Building,
CLEVELAND, O.
Phone, Main 3339 J.

PROFESSIONAL.

W. J. WOOD,

Naval Architect, Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

FIRE BOATS A SPECIALTY.

Complete Plans furnished for Steel, Composite or Wooden Vessels.

543 Postal Telegraph Bldg.

Tel. Harrison 1020.

CHICAGO.

JOSEPH KIDD,

*Marine Architect and Surveyor.
Consulting Ship Builder and Engineer*

Over thirty years' experience. Specifications, designs and estimates. Superintendence of construction and repairs. Damage and other surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade,
DULUTH, MINN.

**HAND BOOK
OF
ADMIRALTY LAW,**
by
ROBT. M. HUGHES,
Price \$3.75.
THE PENTON PUB. CO.,
Cleveland, O.

**IF YOU HAVE TIME AT YOUR
DISPOSAL**

And will solicit subscriptions for
THE MARINE REVIEW
Write us for commission, etc. The result of little effort expended in this direction will be surprising to you financially.

**JUST PUBLISHED
CLASS BOOK OF
NAVAL ARCHITECTURE**

BY W. J. LOVETT Price \$2.50
Illustrated Order from Marine Review, Cleveland.

**NAVAL ARCHITECTS' AND
ENGINEERS' DATA BOOK,**
By T. H. WATSON.

Price, \$1.50.
THE PENTON PUB. CO.,
Cleveland, O.

Weekly. Illustrated. Price 6d.

"The Shipping World"

Written by Experts. Illustrated by Artists.

DEVOTED TO THE INTERESTS
OF A SHIP AND HER CARGO

SPECIAL FEATURES:

Current Events, by the Editor.
Special Articles on TRADE, COMMERCE, SUBVENTIONS, and all SHIPPING QUESTIONS.
Shipping in Parliament.
Shipping and the Law.
Ship Sales and Contracts.
Neptune's Mail, with exclusive News and Notes.
Notes by a Naval Architect, written by Practical Scholars.
Reports on Freight and Marine Insurance.
Trade and Finance.
Board of Trade Notes.
Reviews.
Prices Current.
Launches and Trial Trips.

Orders for subscription to "The Shipping World" are received at the office of the MARINE REVIEW.

ANNUAL SUBSCRIPTION:
United Kingdom, 21s. Foreign Countries, 28s.

THE "SHIPPING WORLD," LTD.,
EFFINGHAM HOUSE, ARUNDEL STREET, STRAND,
LONDON, W. C.

Prindiville & Company

INCORPORATED

**AVERAGE ADJUSTERS
AND
INSURANCE BROKERS**

234 La Salle St.

Chicago, Ill.

Representing
Johnson & Higgins
New York

Foreign Representatives
Willis Faber & Co., Ltd., London.
John D. Tyson & Co., Liverpool.



HOISTING ENGINES.

We build them in all sizes from new and improved designs. Every engine thoroughly tested before leaving our shop, and guaranteed to be satisfactory in every case. When in want of a hoist for marine work, dock work, mining, or any other purpose, kindly permit us to name you prices. We know we can please you.

MARINE IRON CO., - - - Bay City, Mich.

**WRITE US
FOR ANY BOOK ON
MECHANICAL SUBJECTS.
The Penton Publishing Co.
Cleveland.**

WARD LINE

THE NEW YORK & CUBA MAIL
STEAMSHIP CO.

POPULAR ROUTE TO
CUBA, NASSAU, MEXICO

FINEST AND LARGEST STEAMSHIPS SAILING
FROM NEW YORK TO OTHER THAN EUROPEAN
PORTS. HOLDERS OF THE RECORD BETWEEN
HAVANA AND NEW YORK -- 1,240 MILES IN 61
HOURS.

FOUR SAILINGS EACH WEEK BETWEEN
NEW YORK and HAVANA.

WEEKLY SERVICE TO GUANTANAMO, SANTIAGO, MANZANILLO
AND CIENFUEGOS, CUBA, PROGRESO, VERA CRUZ
AND TAMPICO, MEXICO.

SEMI-MONTHLY SAILINGS TO
Nassau, N. P. Bahamas.

LOW RATES OF FREIGHT AND PASSAGE.

SEND FOR OUR SCHEDULES, RATES AND DESCRIPTIVE MATTER.

James E. Ward & Co.
GENERAL AGENTS
90 Wall Street, NEW YORK.

AMERICAN LINE

PLYMOUTH
CHERBOURG
SOUTHAMPTON

Sailing From New York Every Saturday at 9.30 a. m.

St. Louis
(11,629 tons)
New York
(10,798 tons)

St. Paul
(11,629 tons)
Philadelphia
(10,786 tons)

Special Express Train from Plymouth and Southampton
to London and between Cherbourg and Paris.

RED STAR LINE

NEW YORK
ANTWERP
LONDON
PARIS

CALLING AT DOVER FOR LONDON AND PARIS.

Sailing every Saturday from Pier 14, North River, N. Y.

Finland
(12,760 tons)

Kronland
(12,760 tons)

Vaderland
(12,017 tons)

Zeeland
(11,905 tons)

One of the Shortest Routes to LONDON, PARIS, BELGIUM, HOLLAND,
GERMANY, THE RHINE, SWITZERLAND and ITALY.

9 Broadway, New York.

1819 Walnut St., Philadelphia.
India Building, 84 State St., Boston.
1306 F St., N. W., Washington, D. C.
219 St. Charles St., New Orleans.
90-96 Dearborn St., Chicago.
900 Locust St., St. Louis.
121 South Third St., Minneapolis.
21 Post St., San Francisco.
9 East Sixth St., St. Paul.
41 King St., East Toronto.
17 St. Sacramento St., Montreal.

PIERS: 14 & 15 NORTH

RIVER, FOOT OF FUL-

TON ST., NEW YORK.

"MALLORY LINE"

(New York & Texas Steamship Company)

Steamers Leave Piers New 15, 16 East River, NEW YORK

For GALVESTON, TEXAS

Every WEDNESDAY and SATURDAY, taking FREIGHT for all Points in
TEXAS, MEXICO, NEW MEXICO, ARIZONA, UTAH, KANSAS, OKLA-
HOMA, MISSOURI, COLORADO and CALIFORNIA.
Saturday's Steamer touches at Key West, Fla.

For MOBILE, ALA.

A Steamer sails every FRIDAY, 8 p. m., taking FREIGHT for ALABAMA,
MISSISSIPPI, MISSOURI and the SOUTHWEST.

For BRUNSWICK, GA.

A Steamer sails every FRIDAY, 8 p. m., taking FREIGHT for all Points in
GEORGIA, FLORIDA, ALABAMA, LOUISIANA and the SOUTH and
SOUTHWEST.

PASSENGER DEPARTMENT

Six days Ocean voyage to GALVESTON, Texas, thence by rail to All points
South-west. Six days to MOBILE, Ala., through tickets to NEW
ORLEANS. 65 hours to BRUNSWICK, Ga., thence rail to Interior South-
eastern Points.

An especially attractive route through famous "SEA ISLANDS" to
JACKSONVILLE, Florida.

Through Bill of Lading. Insurance at lowest rates.

C. H. MALLORY & CO., General Agents,
129 Front Street Branch Office, 385 Broadway, New York.

BOSTON STEAMSHIP CO.

S. S. "SHAWMUT" S. S. "TREMONT" S. S. "LYRA"

Japan, South China and Manila Steamship Line

Operated in connection with the

**Northern Pacific and Great Northern
Railway Companies.**

Monthly Passenger and Freight Service from
Tacoma and Seattle, Washington.

New Twin-screw American Steamships of
10,000 tons register. Exceptionally large
staterooms, all outside.

OWING TO THE GREAT SIZE OF THE SHIPS,
AND THE IMMENSE CARGOES CARRIED IT HAS
NEVER BEEN NECESSARY TO USE RACKS ON
THE DINING TABLES.

Rates at any office of

NORTHERN PACIFIC RAILWAY,
GREAT NORTHERN RAILWAY,
CHICAGO, BURLINGTON & QUINCY RAILWAY,
THOMAS COOK & SONS, Tourists Agents.

A. WINSOR, PRES.
Boston, Mass.

F. WATERHOUSE, AGENT,
Seattle, Wash.



THE CLEVELAND & BUFFALO

TRANSIT COMPANY

UNPARALLELED NIGHT SERVICE

The Twin Flyers of The Lakes

"CITY OF BUFFALO" "CITY OF ERIE"

Both together being, without doubt, in all respects the finest and fast-
est that are run in the interest of the traveling
public in the United States.

TIME CARD.—DAILY INCLUDING SUNDAY. CENTRAL STANDARD TIME.
Leave CLEVELAND 8 p. m. Arrive BUFFALO 6:30 a. m.
" BUFFALO 8 p. m. " CLEVELAND 6:30 a. m.

Connections made at Buffalo for all Eastern and Canadian points;
at Cleveland for Toledo, Detroit and all points West and Southwest.

Tickets reading over L. S. & M. S. Ry. will be accepted
on this Company's Steamers without extra charge.

Special Low Rates Cleveland to Buffalo and Niagara Falls every
Saturday Night, also Buffalo to Cleveland. Ask Ticket Agents for
tickets via C. & B. Line. Send four cents for illustrated pamphlet.

W. F. HERMAN, G. P. A., Cleveland, O.

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on page noted.
The dagger (†) indicates that advertisement appears once a month.

Almy Water Tube Boiler Co. 41	Drein, Thos., & Son 57	Marine Torch Co., The. 39	Safety Car Heating & Lighting Co. 5
American Blower Co. 60	Dunbar & Sullivan Dredging Co. 43	Maytham, Frank 54	Sahlestein, John 51
American Injector Co. 10	East End Boiler Works 41	McCarthy, T. R. 54	Scherzer Rolling Lift Bridge Co., 47
American Line 56	Elphicks, C. W., & Co. 54	McCurdy, Geo. L. 39	Schrader's Son, Inc., A. 58
American Ship Building Co. 4	Erie Railroad Co. 58	MacDonald, Ray G. 54	Scoville Check Valve Co. 43
American Ship Windlass Co. 2	Falls Hollow Staybolt Co. 60	McKinnon Iron Works 51	Shaw, Warren, Cady & Oakes... 54
Armstrong Cork Co. 60	Fix's S. Sons 58	McLaughlin Iron Works 51	*Shelby Steel Tube Co. 18
Armstrong Mfg. Co. 11	Fletcher, W. & A., Co. 57	Mallory Line 56	Sheldon, G. F. 51
Armstrong Mfg. Co., E. A. 13	Fogg, M. W. 58	Marine Iron Co. 55	Sheriffs Mfg. Co. 47
*Ashton Valve Co. —	Fore River Shipbuilding Co. 57	*Marine Mfg. & Supply Co. 13	*Shipowners' Dry Dock Co. —
Atlantic Works 57	General Electric Co. 60	Martin-Barriss Co. 57	Shipping World Year Book. 56
*Atlantic Works, Inc. —	Gilchrist, Albert J. 54	Maryland Steel Co. 10	Smith Coal & Dock Co., Stanley B. 3
Baker, Howard H., & Co. 60	Globe Clothing Co. 53	Miller, E. S. 51	Smooth-On Mfg. Co. 59
Becher, Fred P. 54	*Goldschmidt Thermit Co. —	Milwaukee Dry Dock Co. 5	Standard Contracting Co. 45
Billett, T. R. 54	Goulder, Holding & Masten 54	Morse & Son, A. J. 55	Starke Dredge & Dock Co., C. H. 45
Bird-Archer Co. 54	Great Lakes Dredge & Dock Co. 1	Moasher Water-Tube Boiler Co. 41	Stratford Oakum Co., Geo. 47
Boland, J. J. 54	Great Lakes Engineering Works 14		*State Manufacturing Co. —
Boston & Lockport Block Co. 11	Great Lakes Register 12		*Submarine Signal Company. —
Boston Steamship Co. 58	*Great Lakes Towing Co. 3		Sullivan, M. 45
Bourne-Fuller Co. 59	Hall, John B. 54		Sullivan & Co. 54
Bowers, L. M., & Co. 45	Hanna, M. A., & Co. 43		Superior Ship Building Co. 4
Breyman & Bros., G. H. 43	Hawgood & Co., W. A. 54		
*Brown Hoisting Machinery Co. —	Helm & Co., D. T. 54		
Buffalo Clothing Store. 53	*Helwig Mfg. Co. —		
Buffalo Dredging Co. 43	Hickler Bros. 43		
Buffalo Dry Dock Co. 5	Holmes, Samuel. 54		
Bunker, E. A. 60	Hoyt, Dustin & Kelley. 54		
Burnett, Geo. W. 53	Hubbell Co., H. W. 43		
Burrill, E. H. 53	Hunt, Robert W., & Co. 55		
*Carley Life Float Co. 18	Hutchinson & Co. 54		
Carlisle, H. T. & L. T. 49	Hyde Windlass Co. 39		
Chase Machine Co. 48	International Mercantile Marine Co. 56		
Cheney, H. P. Sons. 53	Jenkins Brothers 60		
Chicago Ship Building Co. 4	Jenkins, Russell & Eichelberger. 54		
Cleveland & Buffalo Transit Co. 56	Kahnweiler's Sons, David 59		
Cleveland City Forge & Iron Co. 59	Katzenstein, L., & Co. 59		
Collingwood Shipbuilding Co. 12	Kidd, Joseph 55		
Continental Iron Works. 2	Kingsford Foundry & Machine Works 41		
Cory, Chas. & Son 58	Kremer, C. E. 54		
Cramp, Wm. & Sons, S. & E. B. Co. 8	*Lake Erie Boiler Compound Co. —		
*Crandall & Son, H. I. 12	Lake Erie Boiler Wks. 41		
Dake Engine Co. 47	Lee, John J. 51, 53		
Dearborn Drug & Chemical Wks. 3	LeMois Scientific et Industriel. 45		
Dearing Water Tube Boiler Co. —	Lockwood Mfg. Co. 58		
Delaware River Iron S. B. & E. Works 59	Lunkenheimer Co. 9		
Detroit Ship Building Co. 4			
Dixon Crucible Co., Joseph 47			
Donnelly Salvage & Wrecking Co. 57			

FORE RIVER SHIPBUILDING CO.

QUINCY, MASSACHUSETTS

SHIP and ENGINE BUILDERS

CURTIS MARINE TURBINES

HIGH GRADE STEEL FORGINGS

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS

PARSONS MARINE TURBINES

Contractors for Vessels Complete. Marine Engines, Boilers and Machinery of all kinds

Enlarged Facilities

HOBOKEN, N. J.

John Donnelly, Sr., Pres.
H. B. Folger, Treas.John Donnelly, Jr., Vice-Pres.
Thos. Donnelly, Secy.

THE

DONNELLY SALVAGE & WRECKING CO., LTD.

KINGSTON, ONT.

DIVERS, STEAM PUMPS, TUGS, ETC.
SUPPLIED ON SHORTEST NOTICE.

A NEW MAP

showing in detail the entire

WATER FRONT OF BUFFALO, N. Y.

Giving Sounds, Principal Buildings, Railroad Connections, Etc. A copy will be forwarded to responsible parties for inspection, on request.

Price, Cloth Backed, \$7.00.

Marine Review,

Cleveland, O.

The Martin-Barriss Co.

654 Seneca Street CLEVELAND, OHIO

IMPORTERS AND MANUFACTURERS OF

MAHOGANY

WHITE MAHOGANY

and all Native Cabinet Woods

High Grades of Kiln Dried Woods for Cabin Work and Inside Trim

WHITE OAK TIMBERS AND PLANK

Constantly on Hand and Sawed to Order on Short Notice

METALLIC LIFE BOATS AND
RAFTS, YACHTS AND
PLEASURE BOATS
LIFE PRESERVERS

Outfit for Lake Steamers a specialty.

THOMAS DREIN & SON, Builders,

Tatnell St. below Railroad
WILMINGTON, DEL.

The Atlantic Works, EAST BOSTON, Massachusetts.

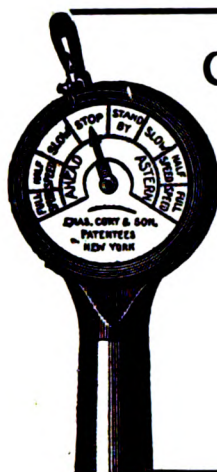
BUILDERS OF

Steamships, Steam Yachts, Tow Boats, Etc.

Marine Engines, Boilers and Tanks.

Heavy Machinery and Plate Iron Work.

THREE MARINE RAILWAYS.



Chas. Cory & Son

Manufacturers of

Mechanical and Electrical
Telegraphs and Indicators.
Engine Bells and Electric
Call Bells.

286 Spring St., near Hudson,
NEW YORK CITY.

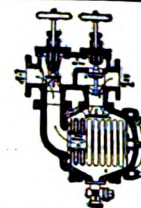
Water Filters, Regulators and Engines.

We make **Pressure Regulating
Valves** for all purposes, steam or
water.

Our **Feed-Water Filter** will keep
oil out of your boiler.

We can interest you if you use a condenser.

Water Engines for Pumping Organs.



Keep Oil out of your
Boiler with the
Feed-Water Filter
For Marine and Land
Service. Two of these
Filters are in use on
the Oceanic.

THE **ROSS VALVE CO.** TROY
N. Y.

QUINTARD IRON WORKS CO. MARINE TURBINES

ENGINES, BOILERS AND MACHINERY

Office 742 E. 12th St.,

NEW YORK

The Lockwood Manufacturing Co.

EAST BOSTON, MASS.

ENGINEERS AND MACHINISTS.

Builders of Steamships, Tow Boats and Marine Engines.

Repairing of Hulls and Machinery.

Tietjen & Lang Dry Dock Co.

HOBOKEN, N. J.

EIGHT DRY DOCKS

600, 800, 1,000, 1,200, 1,400, 1,800, 2,000, 10,000 TONS

General Repairs on Wooden and Iron Vessels

FT. OF 17th STREET

Telephone 700 Hoboken

HOBOKEN, N. J.

Practical Marine Engineering

By PROF. W. F. DURANT

For Marine Engineers and Students, with aids for applicants
for marine engineers' license.

PRICE \$8.00

FOR SALE BY

THE MARINE REVIEW, Cleveland

Going to Pittsburg

1 The Erie Railroad is the only road that sterilizes and purifies, through a process invented by its own chemist, its Passenger coaches, Parlor cars, Cafe cars, Dining cars and Sleepers, a very essential safe-guard to its patrons, for it kills all poisonous germs and makes traveling in such sterilized cars absolutely safe in preventing disease infection.

2 The Erie Railroad has the largest passenger locomotives in the world—only eleven words but they mean a good deal.

3 The Erie Railroad has built and uses a steel Baggage car—something new on steam roads.

4 The Erie Railroad is the road that runs every day (not every day except Sunday, but every day). Seven fine passenger trains from Cleveland to Pittsburg and seven from Pittsburg to Cleveland—that's fourteen fine passenger trains daily between the two cities.

5 The following may surprise you—The Erie Railroad—was the first railroad in the world to run sleeping cars. The Company built two cars, known by the names of "Ontario" and "Erie", remember please that this was before Pullman or Wagner Cars existed.

6 Patrons of the Erie Cafe Club cars Cleveland to Pittsburg have FREE use of the spacious lounging and smoking parlors of the car.

GRAM FIX

ESTABLISHED 1860

J. W. FIX

S. FIX'S SONS

SUCCESSORS TO S. FIX & SON.

Steam Flue Welding Works

Our work stands government test. Our Welds are perfectly smooth.
Write us for prices.

COR. LEONARD AND WINTER STS

CLEVELAND, O.

M. W. FOGG

Mattresses
and Cushions



202 Front St.

NEW YORK CITY.

THE ALLEN DENSE-AIR ICE MACHINE

Contains no chemicals, only air. Proven by many years' service in the tropics on United States men-of-war, steam yachts and passenger steamers. A hundred are in daily service on steamers.

H. B. ROELKER, 41 Maiden Lane, NEW YORK.

Consulting and Con-
structing Engineer.

Designer and Manufacturer
of Screw Propellers.



Established 1844

A. SCHRADER'S SON, Inc.

32 Rose Street, NEW YORK

Manufacturer of

Submarine Armor and Diving Apparatus

We carry a complete stock of Dresses, Hose and
Repair Sundries.

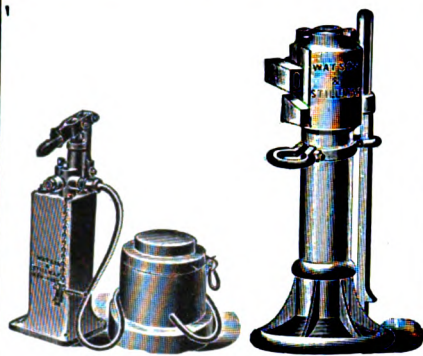
Improved Bolt Helmet All orders filled day received Write for our prices

WATSON-STILLMAN HYDRAULIC JACKS

We build hydraulic jacks, that can be used to special advantage in ship yards and on board a ship.

Watson-Stillman Hydraulic Jacks are absolutely reliable under all conditions, having the ram and cylinder wrought and bored from solid steel billets, ensuring a stability unknown to jacks in which so-called seamless tubing is used.

Send for our Jack List, Edition N, it describes nearly 300 varieties of hydraulic jacks for every purpose, yours for the asking.



WATSON-STILLMAN CO.,

Offices: 26 Cortlandt Street, NEW YORK
453 The Rookery, Chicago

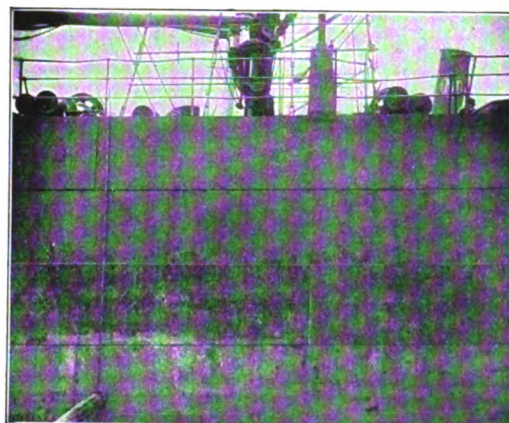
ROACH'S SHIP YARD.



Ship
Building
in all its
Branches

BUILDERS OF
STEAMSHIP AND MARINE MACHINERY.
Delaware River Iron Ship Building & Engine Works
CHESTER, PA.

FOR SHIPS' SIDES, USE

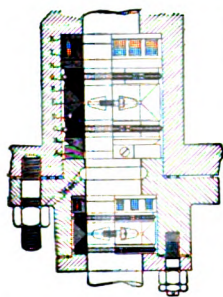


Smooth-On Rivet Iron Cement

It fills all uneven places, making
A Smooth Iron Finish.

Sold in 10-lb. cans only, ready for use.

SMOOTH-ON MFG. CO.
Jersey City, N. J., U. S. A.



Katzenstein's Self-Acting Metal Packing

For PISTON RODS, VALVE STEMS, etc. of every description for Steam Engines, Pumps, etc., etc. Adopted and in use by the principal Iron Works and Steamship Companies in this and foreign countries.

FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure.

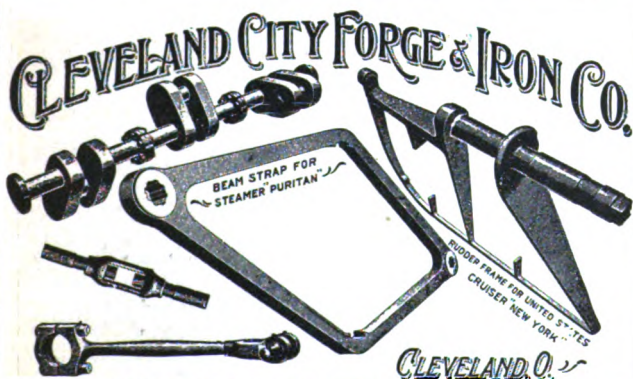
For full particulars and reference, address

L. KATZENSTEIN & CO.

General Machinists.

358 West Street,

New York.



IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

Neversink Cork Jackets and Life Belt

Warranted 24 pounds. Buoyancy and full weight of Cork, as required by U. S. Inspectors.

Safest Consolidated Cork Life Preservers. Cheapest Ring Buoys and Fenders.

Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Awarded four Medals by World's Columbian Exposition.



**Metallic and
Wooden
Life Boats.**



Metallic Life Rafts. Marine Drags.
Manufacturers of Woolsey's Patent Life Buoy—the lightest, cheapest and most compact life raft known.

DAVID KAHNWEILER'S SONS,
Fox Building, Cor. Franklin Sq. and Dover Street,
NEW YORK CITY.



Wilford's Waterproof Cloth is made of pure twisted flax thread. It is stronger and more durable than cotton, and on account of its light weight is most desirable for Hatch, Boat or Sail covers, Tarpaulins, Side Cloth or Roofing. It will not crack and is positively impenetrable by salt or fresh water. Our customers know this—from others we solicit a trial order.

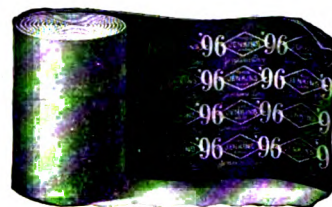
EDWARD A. BUNKER

Sole Agent for the United States and Canada

P.O. BOX 1579, NEW YORK

Jenkins '96 Packing

is a joint packing such as can only be produced by the compounding of the purest and best ingredients, and the use of great care in the manufacture. It is guaranteed to make a perfect steam joint instantly. For durability it is unequalled.



Write for booklet—"Points on Packing."

JENKINS BROS., New York, Boston, Philadelphia, Chicago, London.

General Electric Company

Series edgewise wound arc lamps for ship yards. Special enclosed arc lamps for use on shipboard.

851

Principal Office:
SCHENECTADY, N. Y.

Sales Offices
in all large cities.



Safety and Coal Economy

are realized by our Hollow Stay Bolts. Steam from the center of a broken Hollow bolt always gives positive warning, hence

SAFETY

Air passing into the firebox through the hollow bolt helps combustion, hence

ECONOMY

Tell-tale holes clog up. Hollow stays "never." Passage of air always keeps the holes open.

Send for free literature.

Falls Hollow Staybolt Company
Cuyahoga Falls, Ohio



A FIRST-CLASS Barometer

will often pay for itself a thousand fold.

If you wish to make an investment of that character, write us. We carry a full line with or without thermometers.

The UPSON-WALTON Co.
CLEVELAND, O.



LIFE PRESERVERS—BUOYS

ACME. SOLID CORK. Each Preserver stamped by U. S. Inspector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork Mooring Buoys. Material and Finish Guaranteed.

Orders filled promptly.

ARMSTRONG CORK COMPANY

Boston Chicago New York St. Louis Philadelphia Baltimore Pittsburgh Cincinnati

HOWARD H. BAKER & CO.

SHIP CHANDLERS
and SAIL MAKERS

18 to 26 Terrace,

BUFFALO, N. Y.